X

# REPORT

OF THE

# CONSERVATOR OF FORESTS

FOR THE

## OFFICIAL YEAR

## 1859-60.

SECRETARIAT LIBRARY, MADRAS.
Class A7 No. 120
Book-case 7
BENGAL SECRETARIAT LIBRARY

MADRAS:
PRINTED AND PUBLISHED BY H. SMITH, AT THE
18

# CONTENTS.


| | Page. | Para. |
|---|---|---|
| Pressure on Forests | 1 | 3 |
| Railway requirements | 1 | 3 |
| Military requirements | 2 | 4 |
| Her Majesty's Dockyard | 2 | 5 |
| Railways | 2 | 6 |
| Do. Revised specification list of sleeper-woods | 2 | 6 |
| Trenails and wedges | 3 | 6 |
| Preservation of Timber | 3 | 7 |
| Season of felling | 3 | 7 |
| Ringing or girdling | 3 | 7 |
| Splitting | 4 | 7 |
| Seasoning of Wood | 4 | 8 |
| Kumari cultivation | 5 | 9 |
| Telegraph Department | 5 | 10 |
| Auctions | 6 | 11 |
| Economical working | 6 | 12 |
| Noxious Insects | 6 | 13 |
| Extension of system | 7 | 14 |
| Financial results | 8 | 15 |
| North Canara | 8 | 16 |
| South Canara | 8 | 17 |
| Anamallai range | 9 | 18 |
| Sigúr | 9 | 19 |
| Mudumallai | 9 | 20 |
| Salem | 9 | 21 |
| Nilgiri Sholas | 11 | 22 |
| Teak | 11 | 23 |
| Teak Plantations | 11 | 24 |
| Average growth of Teak | 12 | 25 |
| Blackwood | 12 | 26 |
| Australian Plantation | 12 | 27 |
| Distribution of Tree seeds | 13 | 28 |
| Avenues | 13 | 29 |
| Firewood | 14 | 30 |
| Charcoal | 14 | 31 |
| Bamboos | 15 | 32 |
| Fancy woods | 15 | 33 |
| Dyewoods | 15 | 34 |
| Cinchona | 16 | 35 |
| Tea | 16 | 36 |
| Coffee | 16 | 37 |
| Potato | 16 | 38 |
| Progress of the Department | 17 | 39 |
| Forest Assistants | 17 | 40 |
| Overseers | 17 | 41 |
| Exploring Tours | 17 | 42 |
| Selections from the Forest Records | 17 | 43 |
| Public Gardens | 17 | 44 |
| Manual of Indian Botany | 18 | 45 |
| Herbarium and Library | 18 | 46 |
| Office Establishment | 18 | 47 |

# APPENDIX.


A. North Canara Forest Report.
B. South Canara Forest Report.
C. Anamallai Forest Report.
D. Sigúr Forest Report
E. Mudumallai Forest Report.
F. Salem Forest Report
G. Sál Forests of Northern Circars.
H. Jungle Rules of Coimbatore.
I. Circular for making Charcoal.


## ERRATUM.

| Page. | Line. | |
|---|---|---|
| 11 | 1 | of the General—*read*, of the Genera. |

BENGAL FOREST DEPARTMENT LIBRARY

OFFICE OF CONSERVATOR OF FORESTS.

No. 143.

From H. CLEGHORN, Esq., M.D., Conservator of Forests, to J. D. BOURDILLON, Esq., Secretary to Government, Revenue Department, Fort Saint George, dated 31st August 1860.

SIR,

My annual Tour (third) commenced on 4th January 1860, by an Inspection of the Sandalwood tract in Nuggur, Mysore, and then of the Railway operations in the neighbourhood of Shemogah. Afterwards I crossed into North Canara, and observed the general state of the Forests in the neighbourhood of Sircy and Yellapoor; then I went with Mr. Muller to Hullial and to the Sidh Temple on the Belgaum frontier, which has been the subject of old standing controversy

We passed down into the plateau of Gúnd where the operations are now commencing, and reached Sedashegur by boat.

From this my most distant point, I was summoned by Sir C. Trevelyan, to meet him at Utakamund, and en route to the Nilgiris, inspected the Nellumboor Teak plantations I had the honor of discussing with His Excellency various questions connected with the Forest management of the mountain-ranges and visited the Australian plantations, Segúr and Mudúmallai Forests, part of Wynād and Coimbatore.

In July, having suffered from the effects of fever, I returned to the Presidency.

2. SPECIAL REPORTS DESPATCHED DURING 1859-60, AND DATES OF ORDERS.

| | |
|---|---|
| Memorandum on the introduction of the Cinchona trees, dated 30th August 1859, No. 766. | G. O. 10th September 1859, No. 1397. |
| Kunúr Tea plantation, dated 27th August 1859, No. 762. | G. O. 21st do. „ No. 1272. |
| Report on the Mudúmallai Forest, dated 8th August 1859, No. 744. | G. O. 24th do. „ No. 2293. |
| Report on the Malsar Farm, dated 15th October 1859, No. 820. | G. O. 4th November „ No. 1500. |
| Suitability of Gali-Paravattam Hill for Coffee, dated 15th December 1859, No. 874. | G. O. 10th January 1860, No. 73. |
| Second Report on the Australian plantation near Wellington, dated 15th December 1859, No. 877. | G. O. 20th do. „ No. 101 |
| The Forests and Fuel of the Nilgiri Hills, dated 8th November 1859, No. 836. | G. O. 20th March „ No. 425 |

3. PRESSURE ON FORESTS.—There are many causes at work which are gradually thinning the ranks of our Indigenous Forests. The first and by far the most formidable of these is *Railway requirements* It is scarcely credible the many thousands of large Forest trees which have been felled in the neighbourhood of the various lines of Railway within the last few years

Another source of diminution affecting only scrubby copse and minor forest, is the extension of cultivation, consequent upon the reduction of the land tax and increased facilities of communication. There is every probability that the clearing both of the forest and jungle will go on, as long as grain maintains its present tempting price.

4. MILITARY REQUIREMENTS.—The Barracks at Wellington are now nearly finished, and there has not been much pressure during the year from the Gun Carriage Factory or Arsenals, the only special references have been with regard to materials for gun-stocks and saddle trees.

The Palava wood (*Mimusops Indica*) is in large demand by the Ordnance Department for the former, until recently it was not included among the reserved woods, and the tree accordingly was extensively cut for private purposes. Steps, however, have now been taken to prevent this wood being removed, and the Collector of Tinnevelly (where the tree chiefly grows,) has been requested to inform the Subordinate Revenue Officers in his District, that all private cutting of *Palava* is restricted. The Bér Tree (*Zizyphus jujuba*) is approved for saddle-trees.

5. H. M. DOCKYARD.—A reference was made from the Secretary of State for India, through the Government of Bombay, as to the possibility of supplying a durable timber called "*Aynee*" or *Angili* for the Royal Navy. The Officers in charge of the Forests in Canara, Cochin, Travancore, and the Collector of Malabar, were called upon for their opinions as to the size and quantity procurable in the respective districts. The Report of the Resident of Travancore and all the papers connected with this subject are recorded in Proceedings of Government, No. 806, dated 19th May 1860. Mr. F. N. Maltby believes, that 10,000 loads *per annum* for five years might be supplied at the rate of 12 to 14 rupees per candy,* to the great advantage of the Travancore State.

*Artocarpus hirsutus.*

* 15¼ c. f.

The Admiralty are looking to India for supplies of timber. If the Forests of this Presidency are called upon to any extent to meet the demands of the Home Government, it is evident that the conservancy of all *reserved* tracts must be rigorously enforced. There are many temptations to rob the Forests of the young trees, and the result is that mature timber (Teak especially), is becoming everywhere more scarce.

6. RAILWAYS.—The Madras Railway has hitherto used to a very great extent, the indigenous woods for sleepers. About thirty kinds of Timber* have been tried experimentally, but the experiment has not been attended with satisfactory results; not always, because the woods were worthless, but from the timber not having reached a sufficient age, and from its being used in a comparatively green state. Experience has been gained and better prospects are dawning on the Company in this great essential of Railway operations. The Chief Engineer issued a useful Circular to the Officers of Districts, regarding the branding of sleepers, of which the following is an extract.

"At the time of passing the sleepers they must be branded with a letter showing the kind of wood according to the table annexed:—

"Zinc labels will be prepared which being nailed to the sleeper, will remain legible even after its decay. These will not supersede the branding, but be used in addition to it."

*Revised specification List.

| | | |
|---|---|---|
| 1. | Teak ... ... ... | Tectona grandis. |
| 2. | Sál... ... ... | Vatica robusta. |
| 3. | Sissoo .. ... .. | Dalbergia sissoo. |
| 4. | Pedowk ... ..... | Pterocarpus Indicus |
| 5. | Karra mardá ... | Terminalia glabra. |
| 6. | Maroothy maram. | „ alata. |
| 7. | Acha maram .. | Hardwickia binata. |
| 8. | Véngé maram | Pterocarpus marsupium. |
| 9. | Cadukai maram.. | Terminalia chebula. |
| 10. | Nicani maram .. | Conocarpus. |
| 11 | Nim maram. .. | Soymida febrifuga. |
| 12. | Carru véngé or China Wunny maram | Acacia odoratissima. |
| 13. | Perambe maram .. | Prosopis spicigera. |
| 14 | Iruvalu maram... | Inga xylocarpa. |
| 15. | Velvéngé maram. | (*Vide* 18.) |
| 16. | Katuvela maram. | Acacia Arabica. |
| 17. | Dud Ilupé maram. | Bassa longifolia |
| 18. | Katvai maram . | Acacia speciosa. |
| 19. | Cumbadri maram. | |
| 20. | Somida wood. | (*Vide* 11.) |
| 21 | Aré wood. | |
| 22 | Angili ... .. | Artocarpus hirsutus. |
| 23 | Chór kalli. | (*Vide* 11.) |
| 24. | Karungalli .. | Acacia sundra. |
| 25. | Nat Vadam Cotte | Terminalia catappa. |
| 26. | Vaden Cumé. .. | Bignonia xylocarpa. |
| 27. | Vella Nagé ... | Conocarpus latifolia. |
| 28. | Sadachu. | Grewia tiliæfolia. |
| 29. | Mullu véngé .. | Brideliia spinosa. |
| 30. | Ani Carrar | Garuga pinnata. |
| 31. | Padri maram ... | Bignonia chelonoides. |
| 32. | Puvú maram .. | Schleichera trijuga. |
| 33. | Vilagam. | Feronia elephantum. |
| 34. | Ilyni | |

Mr. Ross, Resident Engineer at Palghat, is working the "Chennat Nair" Forest on contract, where there is a large supply of well grown *Errool* (14), *Véngé* (8), *Karra-mardá* (5); he conducts the operations with energy and judgment. The work is occasionally inspected by myself, or the Assistant in charge of the Anamallai range. Permission has also been given to the same Company to obtain timber for the N. W. Line from the Forests of Nuggur in Mysore, which have lately been placed under the care of Dr. Oswald. Mr. Brice, Resident Engineer at Bellary, met me at Hurryhur, and we concluded the arrangements with the Mysore Government. The large and extending Timber trade on the Tumbudra is forming a new and interesting feature of the country.

TEAK, which is more durable than any description of fir, although prepared with creosote, and the best of all woods for sleepers, is considered by the Officials of the Company too expensive.

SAL, the next best, is only procurable in any quantity in Orissa. The Agent of the Madras Railway has been negotiating with Messrs. Binny and Co., for the purpose of procuring it from the

district of Ganjam. The *Pyengadu* of Burmah, which Lieutenant Williams recommended in his letter to the Chief Secretary,* as a superior wood and suitable for Railway purposes, is identical with the *Errool* of Malabar, the *Jambay* of Canara, and is the *Inga Xylocarpa* of Botanists.

* P. M. O., No. 544, dated 18th August 1859.

Jarrah or Yarrail.—*(Eucalyptus rostrata)*, a wood from Western Australia was specially noticed in a Despatch from Lord Stanley to this Government,* and furnished to the Agents of the Railways in this Presidency. This wood "Mahogany," of the Colonists is being largely imported into Scinde and Ceylon, and Mr. Acworth intimated to me that he had entered into a contract for 7,000 Jarrah sleepers. It is important to watch this experiment, as the result is of the first moment; no wood having hitherto been found to resist white ants (*Termites*), combined with exposure to heat and moisture. A timber trade with Australia would benefit the Colony and supply the Indian market with a substitute for Teak, which is yearly becoming more scarce and costly. The first cargo of Yarrah has arrived from Swan river.

* Dated 9th January 1859. G. O.

Some of the species of *Eucalyptus* are considered half-hardy in the South of England, and as there are many remarkably fine specimens on the Nilgiri Hills, and a few also at Bangalore; there is reason to hope that these valuable trees may succeed on our mountain-ranges, and furnish a timber superior to any of the indigenous woods.

It has recently been proposed to substitute sleepers of cast iron for those of wood, and the plan has already been carried out on a large scale; it is thought that iron will in the end be found the most economical material for sleepers.

*Trenails and Wedges.*—The Indian woods which appear to be best adapted for these purposes are *Kara mardá* (Terminalia glabra), and *Sál* (Vatica robusta). The former for trenails, the latter for wedges. Sál is a hard wood, possessed of considerable elasticity and resists the attacks of white ants. These woods should have a second seasoning after they are manufactured, as there is a material shrinking immediately after the piece has been cut out of the log and shaped. The ends of the trenails should be dipped in tar as a precautionary measure.

7. The preservation of Timber.—In an economical point of view, this subject is of the greatest importance, *e. g*, Railway sleepers which ought to have stood five or six years at least, have been found useless after being laid down not more than one-third of that time; in fact there are some parts of the Madras line where it was necessary that they should be taken up and replaced before the District itself was completed.

The durability of woods is affected by a variety of causes, and their liability to rapid decay may be prevented by certain precautionary measures.

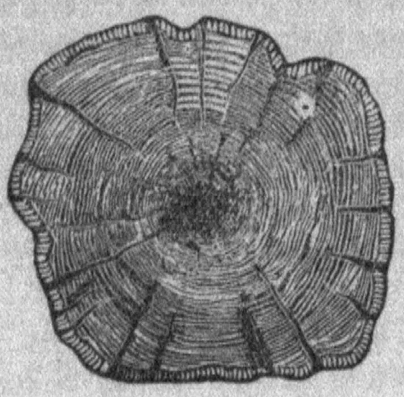
I. *Season of felling.*—The sapwood is the portion of the tree first liable to undergo fermenting changes, it is to these changes that the decay is traced, and it is therefore of the utmost importance that the tree should be felled at those seasons when it contains the smallest portion of sap, in the case of trees (Teak) whose leaves are deciduous, this is indicated by the nakedness of the tree, and in evergreens by the ripening and falling of the fruit.

The proportion of heart to sapwood varies in different trees according to the age at which they have been felled and the soil upon which they have grown (ex. Teak tree in Malabar differs from Teak in Anamallai). In mature trees there is no sapwood, and it is one of the main objects of conservancy that these only should be cut. There is another point in connection with the period of felling which ought to be noticed. It is a wide-spread opinion that trees should be felled during the wane of the moon. This planetary influence is open to doubt, but the opinion prevails wherever there are large forests, the wood cutters of South America act upon it, and the natives of this country believe that the timber is much more likely to decay if cut, when the moon is in "crescente."

II. *Ringing or girdling.*—The custom of ringing the tree before felling has been advocated on the ground, that the seasoning is thereby expedited and also more thoroughly effected. This is doubtful at least in oil-containing trees (as Teak), but the practice appears to be contra-indicated for other reasons; when a tree has been ringed, the wood-cutters object to cut it down on account of its increased hardness, this objection might be waved, were it not for another and more serious one which has been adduced; it is believed to be a fact by some, that trees felled after girdling have the heart-shake increased. It is difficult to explain this, if it be actually the case

III. *Splitting.*—It is of the utmost importance that timber in the process of seasoning should be protected from heat, and particularly from the hot winds. The external fibres of the wood being first exposed, contract, and as there is no corresponding shrinking of these fibres in the centre, cracks and splits are the result. These detract from the value of the wood, as it cannot be applied to purposes for which otherwise it would be available. It is not always possible to obtain suitable shelter for the timber, nor is it at all times desirable that the logs should be under cover, at least they should never be so enclosed that they cannot be exposed to a free current of air. The ends are most liable to split up, and there the cracks are generally radial, but occasionally concentric. The harder the wood, the more likely is it to crack and rapidly extend. The best modes of protection are dipping the extremities of the log or sleeper in *shāni*,* or covering them with grease, mud, petroleum or matting. The Wood oils smeared upon timber also tend to its preservation.

FIG. 1.

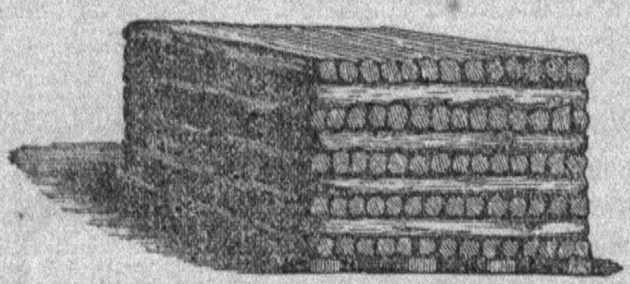


*Showing radial and concentric splits.*

The piles of wood should be supported on bricks or stones, and the ground should be strewn with ashes to prevent the growth of grass or fungi.

8. SEASONING OF WOOD.—Several methods have been proposed for the treatment of Timber after it has been felled. It is of the utmost importance that the sap should be allowed freely to dissolve out. Some of the modes which have been adopted are incompatible with this, and are therefore, so far unsatisfactory. The object of Boucherie's process is to displace the fermentable sap by a fluid less liable to change. His method has been largely practised in France, and there favorably reported on; but subsequent experience shows that its success remains to be proved. Another fact should be mentioned that this fluid can only be made to penetrate the softer woods, refusing, *e. g.*, to pass through fully-formed oak. Reference was made to this process in last year's summary, (paragraph 10). A full account of it is given in the Reports, &c. of the Permanent Way Company, in London, who have adopted this method in the preparation of Railway sleepers.

FIG. 2.



*Pile of Wood raised on bricks.*

Boucherie's process.

Timber, if expected to endure, must be thoroughly dried by exposure to sun and air; this desiccation may be expedited by first immersing the timber in water and then drying it in a current of air; the importance of ventilation cannot be over-estimated, in fact there are instances where the dry-rot has assailed beams of wood and been arrested by allowing a free current of air to act upon it. Instead of immersing the logs in water, the practice is sometimes adopted of burying them in a dung-hill. This is simply a modification of the steaming process by which the nitrogenous matter is dissolved out.

The following modes of preserving timber may also be referred to, *viz.*, the Burnettizing process and that of Mr. Bethell. The former which consists in charging the wood with a solution of chloride of zinc, appears on the whole to be the best and most practicable. It has been thoroughly tested in Her Majesty's Dockyards, and found to withstand not only the effects of moisture, but the inroads of insects and fungi. The fact that insects and dry rot are in this country the greatest enemies of timber is all in favor of the chloride of zinc. Mr. Bethell uses creosote, with the object of "coagulating the albumen and preventing putrefactive decomposition." His process has been and still is being tested on the Railway. It would be premature to give an opinion on

Sir Wm. Burnett's and Mr. Bethell's processes.

* Cowdung and water.

this experiment, but expectation is not now so sanguine as it was some time ago. The fact is, the creosoted sleepers have of late been found decayed in the centre, the interior portion scooped out, leaving nothing but a deceptive shell, in some instances not more than half an inch in thickness. Much credit is due to Mr. B. MacMaster, Resident Engineer, Salem, for the careful observations which he has been making for some years, on the sleepers laid down along the districts under his charge. The result of these observations* will be interesting and important.

Apart from the tendency of Timber to decay from causes existing in itself, and the attacks of fungi, insects and the like; it is said that another and very important source of destruction is, the applying end to end of two kinds of wood, as for instance, "Oak to Malabar Teak, or Lignum Vitæ, the harder of the two will decay at the point of juncture. If this be really true, it is a matter of great importance, and its truth should be established or overthrown by experiment."—*(Gard. Chron., 30th June 1860)*

In summing up this subject, it ought distinctly to be borne in mind that no tree ought to be felled except those which have arrived at maturity, unless strict attention be paid to this rule, the most careful seasoning may fail and premature decay be induced. Another error frequently committed is, that of painting *green* wood for stakes, posts, and the like. The almost inevitable result of this is, that the centre is transformed into touchwood. Considerable difficulty is experienced by this Department in having always the requisite amount of seasoned wood in store. It is therefore of importance that Public Departments should forward their indents, so as to allow sufficient time for the proper selection of the tree and due seasoning of the log.

One great advantage of careful seasoning, seldom taken into account is, the increased facility of carriage both by land and water. Captain Morgan calculated that the seasoned logs (Teak) carried up the Sigúr Ghát to the Wellington Barracks, are 25 per cent. lighter, after lying two years in Depôt below; this would be a material consideration in estimating the cost of the Lawrence Asylum, or any other large buildings on the Nilgiris. Again, as to floating, the seasoning of the logs is indispensable: two years are required for Teak and Sál, and three years for Blackwood.

9. KUMARI CULTIVATION.—The Government have issued definite orders† on the future treatment of Kumari cultivation in Canara, which is now prohibited, except in cases where the land has been so cultivated within the last twelve years. It is understood that under no circumstances, valuable forests are to be so treated.

† 23rd May 1860, No. 830.

It has been shown that the system is injurious to the welfare of the wandering tribes by whom it is practised, for although Kumari is itself profitable, the growers are not the gainers, the Soucars on the coast enjoying the larger share of the profits. Moreover, the cultivation is probably prejudicial in a sanitary point of view, and the ease with which a subsistence is obtained has an effect upon the people by no means conducing to enterprise and healthy development in any form.

The benefits, such as they are, following this rude system of culture are only temporary, the crop of the first year brings good returns, and the clearance may be useful to health; but the ground being abandoned after the gathering of the crop, becomes quickly overgrown with dense impenetrable scrub, more injurious to the inhabitants than the forest of lofty trees which had been destroyed. When *Kumari* does not interfere with the growth of valuable timber as in the taluq of Bekul (where it is exhausted), the Government has exercised forbearance, and Kumari has been allowed to continue for the present. The operations of the Mallialis on the Shervaroy Hills have, in like manner been restricted.

10. TELEGRAPH DEPARTMENT.—The demand for Telegraph posts is much less than it was formerly. Instead of using Teak for the support of the wires, *Mutti* (Terminalia coriacea) is employed in those Central Districts where Teak is scarce, and Sál in the Northern division.

So long as the timber was sunk in the ground, the posts were constantly damaged by the ravages of white ants; but now that a metallic socket has been supplied, the wood is safe from their attack. A further precaution is taken to preserve the lower end of the post by running liquid dammer into the metallic sheaths, so that the enclosed part of the post is encased with a coating of resin.

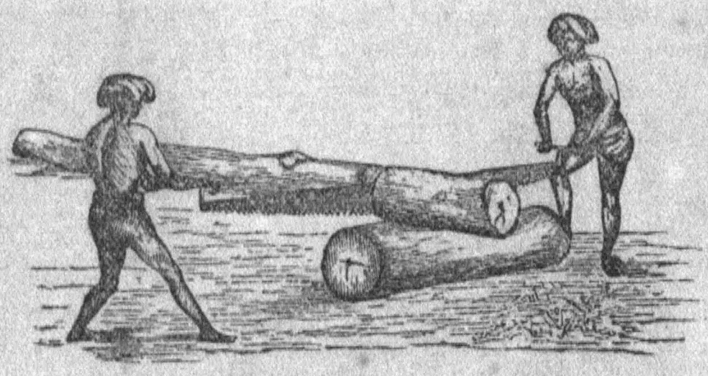
* Mr. M. informs me that "decay of sleepers nearly always commences *under the chairs*, these hold water like a cup which gradually soaks into the wood."

11. Auctions.—The system of periodical Auctions is continued. All sound timber which would otherwise be left to rot or burn is collected and disposed of in this manner. The numerous heavy indents and constant pressure on the Forests dispose of most of the wood as soon as it is arranged in the Depôts, so that the Sales are confined to the 2nd and 3rd classes of timber. It is most important that this system should be continued, as, if we do not enable the people to procure wood by purchase, illicit practices will certainly spring up.

12. Economical working.—In my first Report, allusion was made to the system of slovenly felling and wasteful trimming, which generally prevailed throughout the country. I am not able to state that these practices have been abandoned by the Forest tribes, who are notoriously improvident, but wherever Government is working the Forest under the supervision of their own Officers, the rules laid down as to felling, squaring and seasoning, are strictly attended to.

The introduction of the cross-cut saw in lieu of the rude woodman's axe made by the village blacksmith is a source of great economy and the use of this implement is insisted upon wherever practicable. As it is very expensive to bring gangs of trained sawyers from the towns, it is found more advisable to instruct the Hill tribes (Mulsars) and Wuddurs in this occupation, and by paying ready money for the work done, a great improvement is taking place.

Fig. 3.



*Natives using the Saw.*

The marginal Fig. 3 shows the method of using the cross-cut saw which may be purchased in the shops for about 8 rupees. Planks and sleepers are now prepared for the most part by the saw instead of the axe, and a great saving of material is hereby effected.

The introduction of Saw machinery was referred to in my first summary, and the opinion I then expressed that it should be left to private enterprise was approved by Government. Since that time a large Steam Saw Mill has been in active operation at Wellington, under the superintendence of an Engineer, which is indispensible.

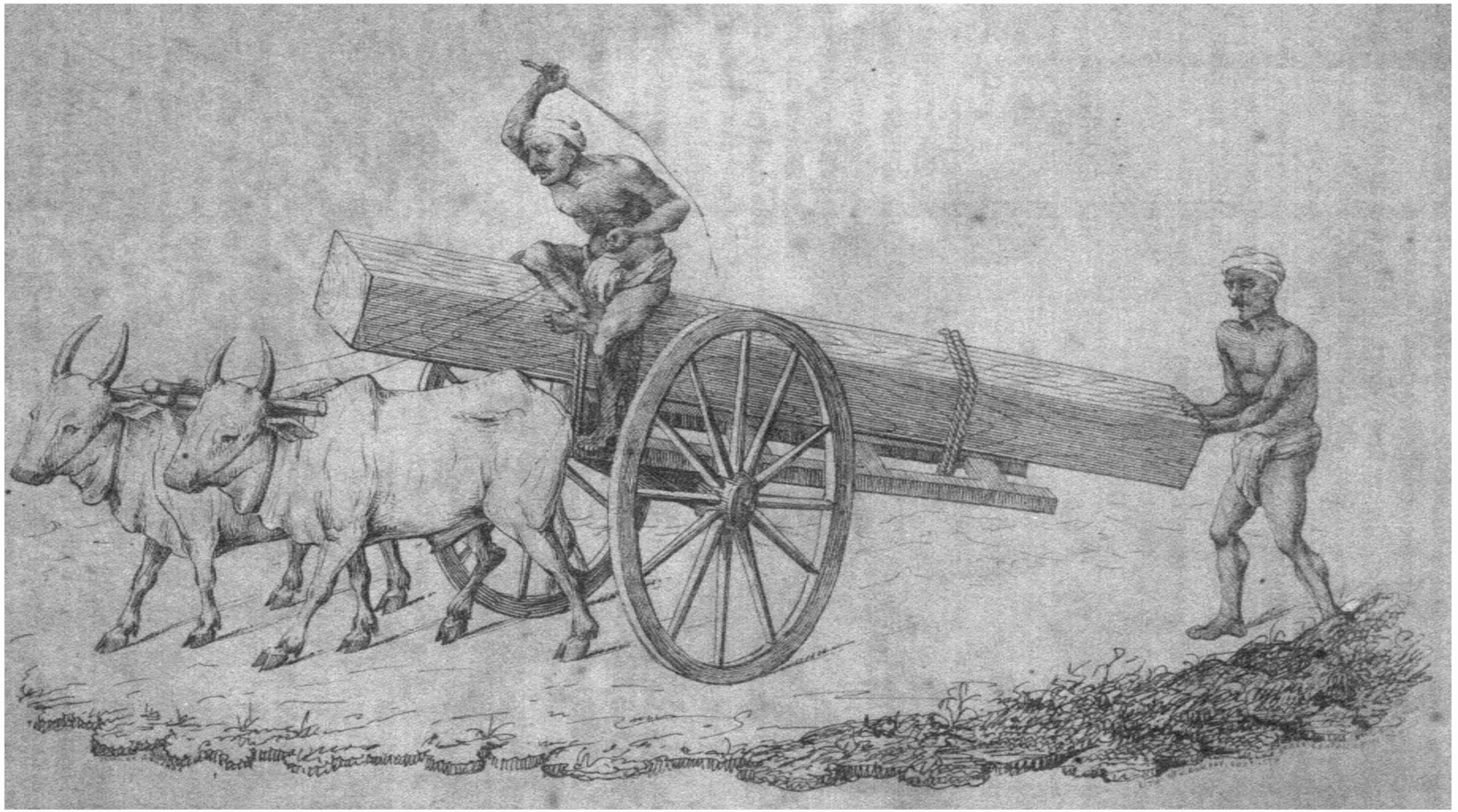
When the logs are prepared, they are placed upon carts and carried to the Inland Depôt or to the rivers, as the case may be. The annexed sketch *(fig. 4.)* shows the usual way of loading a country cart with a squared beam of, say 18 or 20 cubic feet.

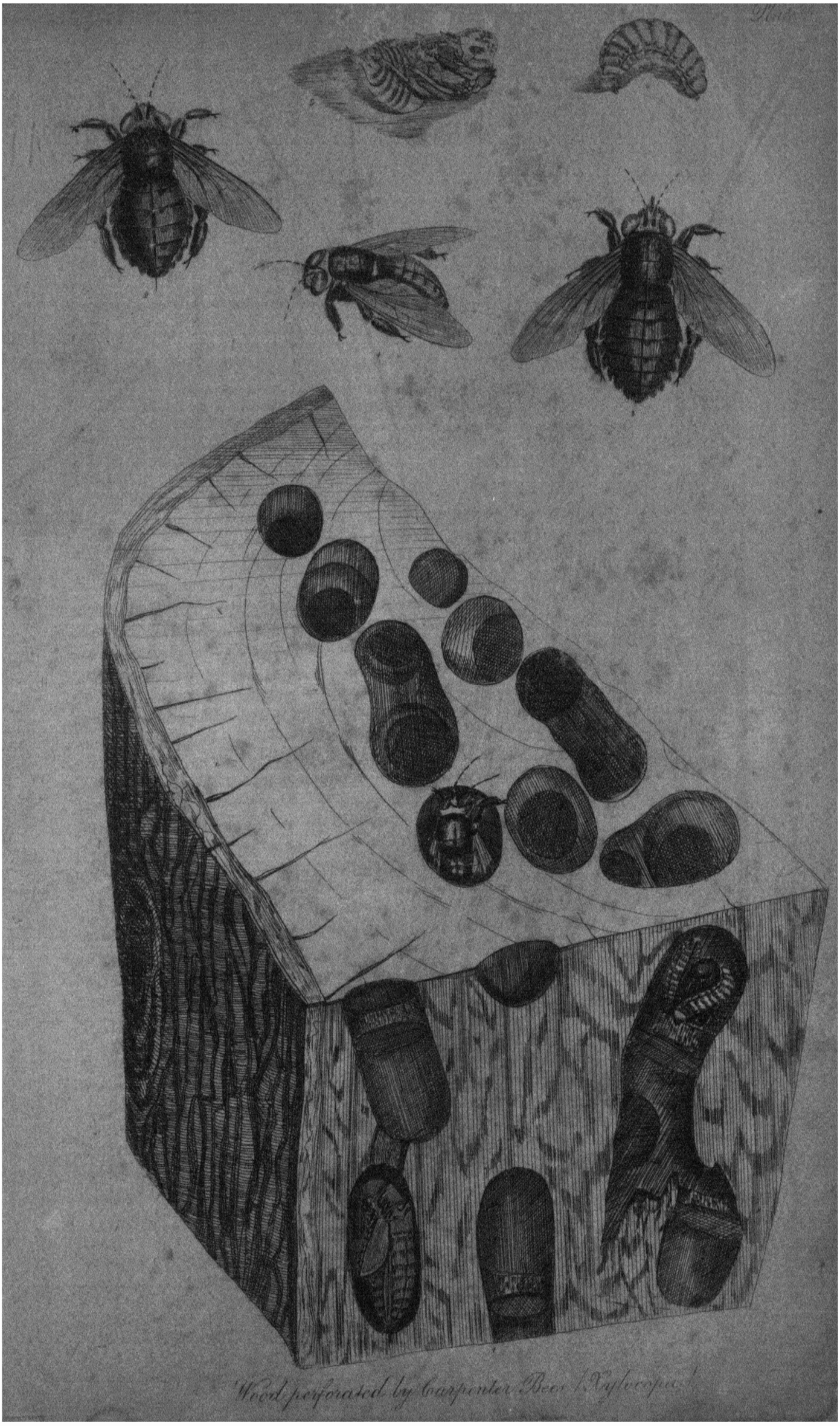
The effects of the great destruction of trees are already visible. The extravagant waste of the wood in the roofing of Native houses, is gradually being diminished, at least in our large towns, where the increasing value of timber is distinctly felt. The manufacture of tables or other furniture from a single piece of wood is seldom seen, and materials less valuable than Teak are now used for camp chairs and ammunition boxes.

13. Noxious Insects.—The injuries sustained by the woods and forests from the attacks of destructive insects can scarcely be estimated: those which are best known to us as wanton and indiscriminate destroyers are, the white ant *(Termites)*, and the carpenter bee *(Xylocopa)*. The former attacks the timber not only during its growth, but after it has been felled; the latter confines its ravages to the dead wood. Much good might be effected if the public servants attached to Government buildings were instructed to destroy this insect, whenever it is seen by them. It is this large blue wood-cutter *(Xylocopa)*, which tunnells through the beams and posts of our public buildings which they frequent in numbers. The passages are from 12 to 15 inches long, and more than half an inch in diameter. If the insects are numerous, their ravages are dangerously destructive and they soon render the beam unsafe for supporting the roof. The accompanying engraving *(Fig. 5.)* illustrates the mischief caused by these carpenter bees in a log* of Cadukai *(Terminalia Chebula)*, the wood appears as if pierced by an Augur, and well represents the peculiarly injurious nature of their attacks. It would be very useful if officers in charge of buildings, directed their attention to the best means of ejecting or destroying these Hymenopterous insects.

*White Ants.*—Numerous expedients have been suggested to arrest the ravages of white

* Sixteen carpenter-bees were found in a cubic foot of wood.




Wood perforated by Carpenter Bees (Xylocopa)

apts, all of which have been only partially successful. Some of these appeared in the Government Records and have been circulated for information.

Captain Fraser, Bengal Engineers, mixed yellow arsenic *(Hurtal)* with the paint, white-wash and masonry of the King's Magazine, Fort William, and the building was favorably reported upon after three years.

YELLOW ARSENIC.

Captain Man and Captain McPherson, painted the joists and planking of several buildings at Singapore, with *Gambier Composition*, the result was perfect success although the buildings had been previously infested with white ants

GAMBIER COMPOSITION.

"*Gambier composition*—Dissolve 3 pints of gambier in 12 of dammer oil over a slow fire, then stir 1 part of lime, sprinkling it over the top to prevent its coagulating and settling in a mass at the bottom; it must be well and quickly stirred. It should then be taken out of the cauldron and ground down like paint on a muller till it is smooth, and afterwards returned to the pot and heated. A little oil should be added to make it tractable, and the composition can then be laid over the material; to be treated with a common brush.

Against the *teredo* I substituted the same portion of black varnish or tar for dammer oil. I of course omitted th grinding down which would not answer with tar.

*Extract from Milburn's Oriental Commerce*, 1813—'Gutta Gambier is juice extracted from the leaves of a plant of the same name *(Uncaria Gambir)* growing in Sumatra &c. inspissated by decoction, strained, suffered to cool and harden, and then cut into cakes of different sizes or formed into balls. Chief places of manufacture—Siak, Malacca, and Bittang. It is used by the Malays with the leaves of betel in the same manner as *Cutch* (or *Catechu*) in other parts of India For this purpose the finest and whitest is selected; the red being stronger tasted and rank is exported to Batavia and China for the purposes of tanning and dyeing.'

Now exported to England to some extent."

Colonel Scott, Acting Chief Engineer at Bombay, records instances of timber being boiled under pressure in various antiseptic solutions with very satisfactory results; but considerable apparatus is necessary and the expense forbids its use except in large public works.

Sulphate of copper.
Arsenious acid.
Corrosive sublimate.

Little or nothing is on record regarding the many insects which prey upon our Forest trees. The subject is most important, they perhaps effect more injury than all the other sources of decay. The only one who has paid particular attention to this branch of science and who is able to supply information is, Mr. S. N. Ward, C. S. By means of his beautiful figures, I hope to interest the subordinates of the department in this part of practical Forestry.

If any meet with pieces of timber attacked by wood-boring beetles, I should be glad to receive specimens showing the burrows, and especially if they contain the larvæ.

14. EXTENSION OF SYSTEM.—I. *Ossoor and Denkinakottah.*—Steps have been taken towards the appointment of an Overseer for the conservancy of the Sandalwood jungles in Ossoor and Denkinakottah. It was thought desirable to extend the system of conservancy to these Forests, it being necessary to provide against the theft of the Sandal trees, and to prevent the young plants from being destroyed by strong creepers which grow everywhere around. The progress of the Bangaloro branch Railway, moreover, pointed out the propriety of having a subordinate of this Department, to number and Register the trees available for sleepers, &c.

II. *Madura.*—In compliance with a recommendation made by His Excellency Sir C. Trevelyan, in paragraph 33 of his Minute, dated 8th February 1860, an Overseer has been appointed to the Madura Forests, to prevent the reckless cutting of Timber, and to mark from year to year the trees which arrive at sufficient maturity and are fit to be felled. His attention will be particularly directed at first to the slopes of the Pulni Hills and Cumbum valley which are reported to contain valuable Timber.

III. *Cuddapah.*—This district has hitherto been inadequately explored and conserved. It has now become necessary that the jungles there be brought under strict surveillance. The Railway which is to run through the whole length of the district is advancing, and the demand on these Forests for sleepers and the like matter will soon become pressing. An efficient Assistant has been appointed for this duty.

IV. *Kurnool.*—The present and prospective operations of the Irrigation Company, as well as other Public Works have invested the Forests of the Nallamallai Hills with considerable importance and the attention of this Department has been drawn to them by Government. A brief account of these Hills, by Captain J. G. Russell, was published about eight years ago in the *Fort Saint George Gazette*,* but it does not convey so favorable an idea of them as the reports of Captain Rundall* and Lieutenant Beckley.† Lieutenant Beddome, who is an excellent explorer has been instructed to visit these Forests and arrange measures for the judicious selection of the Timber.

* P. 1220, December 1852.

In connection with increased attention to the forests of this Presidency, I may observe that

* Procs. Government, No. 690, dated 4th April 1860. † Procs. Government, No. 1188, dated 18th July 1860.

applications for our rules have been received from Ceylon, Hyderabad and Nagpore, where Forest establishments have been or are about to be organized. The Portuguese Conservator in the Territories of Goa is in constant co-operation with my Assistant, Mr. Müller.

15. Financial Results.—The Accounts of the Department for the past official year have been forwarded to the Board of Revenue as directed in paragraph 37, No. 886, dated 18th February 1860, of the Board's Proceedings, and referred to in the latter part of paragraph 5, of Proceedings of Government, No. 1021, dated 21st June 1860. From the following Table it may be seen that the operations in the several Forests have been financially profitable :

*Financial Results of Conservancy for* 1859-60.

| Name of Forests. | Receipts by the sale of Timber, &c. | | | Disbursements including the cost of establishment and contingent charges. | | | Balance in favor of Government. | | |
|---|---|---|---|---|---|---|---|---|---|
| | Rs. | A. | P. | Rs. | A. | P. | Rs. | A. | P. |
| Anamallai | 2,65,953 | 1 | 0 | 22,484 | 9 | 4 | 2,43,468 | 7 | 8 |
| Sigúr | 2,593 | 3 | 6 | 2,147 | 15 | 3 | 445 | 4 | 3 |
| Salem | 29,482 | 6 | 7 | 4,040 | 6 | 6 | 25,442 | 0 | 1 |
| North Canara | 2,00,767 | 13 | 1 | 57,664 | 6 | 10 | 1,43,103 | 6 | 3 |
| South Canara | 8,650 | 11 | 7 | 1,897 | 11 | 8 | 6,752 | 15 | 11 |
| Nilgiri Sholas | 909 | 14 | 0 | 50 | 0 | 6 | 859 | 13 | 6 |
| Total.. | 5,08,357 | 1 | 9 | 88,285 | 2 | 1 | 4,20,071 | 15 | 8 |
| *Deduct General Charges.* | | | | | | | | | |
| Pay of the Conservator of Forests, Establishment, Contingent charges, &c.... | | | | | | | 21,722 | 12 | 3 |
| Actual Profit... | | | | | | | 3,98,349 | 3 | 5 |

16. North Canara.—Mr. Müller's report is carefully drawn up. It contains a full statement of the operations in detail and is creditable to him. The principal portion of it will be found in Appendix A.

Mr. Müller enters fully into the effects of introducing the *Amani** system, the benefits of which are not so much seen in increase of revenue as in economy of material. In paragraph 13, he has given a tabular statement of the receipts and expenditure for seven years, which shows the result of conservancy from the beginning.

We have still much difficulty in arranging the contracts for felling and transporting timber on account of Government, but there is less trouble in this respect than formerly.

The operations in Gúnd are commenced, and with the united efforts of Captain Walker, the District Engineer, and Mr. Müller, I have no doubt, they will be successfully carried out. I may here state that as regards Government Forest on the Malabar Coast, it is chiefly from the plateau of Gúnd that we look to meet the prospective demands of Her Majesty's Navy.

In the adjoining territory of Goa, the cultivators formerly cut down all trees indiscriminately, but of late years a very strict conservancy has been kept up; there is an officer specially appointed to the purpose, who frequently meets Mr. Müller on the frontier.

I have the great satisfaction of knowing that the Collector of this District takes a deep interest in Forest management and co-operates cordially with Mr. Müller in the extensive operations now in progress.

17. South Canara.—As Canara is now divided, the Southern Forests require separate notice. These are under the charge of Mr. E. Thompson, Overseer, generally stationed at Pútúr, who forwards his Reports through the Collector, and is in frequent communication with him. Mr. Fraser, the Collector's Report on Forest revenue, is in Appendix B. The suggestion made in paragraph 3, regarding the supply of fuel to Sandal stills, met with my entire concurrence and the system has been altered. These Oil merchants now stand on the same footing as the other people. A large contract has been entered into, for the supply of Mangalore with wood from Sooliah. It will probably be necessary to strengthen Mr. Thompson's hands, by granting him a small permanent Establishment.

* Government determining what shall be cut and what shall be sold.

18. ANAMALLAI RANGE.—Lieut. Beddome's report of the working of this fine reserved Forest is given in Appendix C. The first point specially calling for remark is the unusually large income which, as explained in my last year's Report, (paragraph 14), arises from the value of Timber sold in 1858 and 1859, being included along with that of 1859-60.

It will be observed that the wood sold to the Bombay Government for Naval purposes, is much smaller in 1859-60, than in 1858-59. Again, the timber sold to the Agents of the Madras and Great Southern of India Railway Company, is much larger than in previous years. The trees felled, comprehended various kinds of the better indigenous trees, as well as Teak and Blackwood.

Owing to the extreme difficulty of obtaining axemen and sawyers, all available hands being engaged at remunerative rates by the Railway Company, there was much less timber felled than usual. The attention of the Establishment was directed to the removal of old outlying timber scattered about in the Forests. The dragging of this to the* slip by elephants was an important work, and, has much reduced the list of "wood unaccounted for."

After careful inquiry, the rate of Cart hire above Ghát has been increased 20 per cent., this was unavoidable. The Mulsar Farm was abolished, and these wild denizens of the Forest are now under instruction in sawing and carpentry. They are not yet skilled workmen, but they are improving, and their labour is of immense value to us; being *indigenous*, they enjoy comparative immunity from the diseases incident to casual residents in that trying climate.

G. O., dated 4th November 1859, No. 1500.

The commencement of a Teak Plantation has been made, the great difficulty is the want of labor, which is much to be regretted as the soil and climate are peculiarly favorable to the growth of Teak: another hindrance is the abundance of wild animals, which occasions the necessity of strongly fencing the nursery. One of the peons has been thoroughly instructed in Teak sowing at Nellambúr.

It is proposed that the Superintendent of this range should visit the neighbouring hills during the non-working season, removing any ripe trees at Pomachi, visiting the Palghat and Walliar Jungles, and making arrangements for the periodical cutting of the Sandal trees in Collegal.

19. SIGÚR.—This Forest had been held in contract for three years, by one Hoossain Baba, whose lease expired last year (*vide* Report 1858-59, paragraph 13), when the Forest came under the management of this Department, and is now carefully supervised by Captain Morgan, whose Report forms Appendix D.

The sale of jungle Timber and Sandalwood has, as predicted, "covered the expenses and yielded a profit." The young Teak trees are coming on well, and if the increase of cultivation in this valley does not materially encroach upon the Forest, there will be a sufficient supply of moderate scantling for Utakamund in future years.

The depôt at Sawyers' village was well stocked when I inspected it a few months ago. As a general rule, we deliver at the depôts; but in this case, the position below Ghát is unfavorable for auction sales, which answer better at Utakamund; consequently, the arrangements for transporting the timber, fall upon Captain Morgan.

20. MÚDUMALLAÍ.—This Forest rented by Government from the Raja of Nellambúr is also under the charge of Captain Morgan, an abstract of the operations forms Appendix E. During the past year 37,602 cubic feet in the lóg, have been delivered at Wellington, in addition to a large quantity of wrought timber from Gundelpett Workshop supplied to the Barracks.

The Account Current of the operations passed through the Department Public Works, as the expenses have been paid out of the Barrack estimates. It is proposed that during the remainder of the lease (three years), the Forest shall be worked by Captain Morgan on account of Government and the timber stored at Sawyer's Village till required for the Lawrence Asylum and other† Public buildings about to be erected at Utákamund. Periodical Sales for the benefit of the Community will take place.

21. SALEM.—A brief Report of the operations of this District will be found in Appendix F.

The proceeds consist of two items, seignorage for sleepers supplied to the Railway Company amounting to Rupees 23,471-10-0, and seignorage for House building material taken by Wood merchants at 1 Rupee per cart load, which realized Rupees 6,010.

---

* The formation of a Ghat in lieu of the rude timber slip, has been entered in the Budget and will greatly facilitate the operations of the Department.

† A Church, Penitentiary and Soldier's Rest-house, have been sanctioned.

The great pressure for Railway sleepers is nearly over in this Central Province, and we have now to consider matured arrangements for the ordinary demands which may be expected.

A statement is annexed, showing the number of sleepers delivered during the year in the Salem district, and the trees furnishing them, as far as it has been possible to ascertain them. Considering the difficulty of getting accurate information from Native contractors, this return cannot be considered absolutely correct, but it is sufficiently so to enable us to deduce some useful results.

| No. | Native Name. | Botanical Name. | Total. |
|---|---|---|---|
| 1 | Pillé Marda | Terminalia | 34,260 |
| 2 | Maruti | Terminalia alata | 26,717 |
| 3 | Vella Naga | Conocarpus latifolia | 25,092 |
| 4 | Véngé | Pterocarpus marsupium | 18,960 |
| 5 | Kar Marda | Terminalia glabra | 18,502 |
| 6 | Cadukai | do. chebula | 16,132 |
| 7 | Sadachu | Grewia tiliæfolia | 11,138 |
| 8 | Cumbadri | | 9,405 |
| 9 | Ácha | Hardwickia binata | 8,064 |
| 10 | Erruvalu | Inga xylocarpa | 7,657 |
| 11 | Dud Illúpé | Bassia longifolia | 7,101 |
| 12 | Kátvai | Acacia speciosa | 7,054 |
| 13 | Sál | Vatica robusta | 6,540 |
| 14 | Áré | | 4,860 |
| 15 | Auny Currer | Garuga pinnata | 4,453 |
| 16 | Pádrí | Bignonia chelonoides | 3,317 |
| 17 | Carru-véngé | Acacia odoratissima | 2,651 |
| 18 | Pedowk | Pterocarpus Indicus | 2,615 |
| 19 | Ilupé | Bassia | 2,463 |
| 20 | Chella Wúnjé | Acacia odoratissima | 2,411 |
| 21 | Nicani | Conocarpus | 2,254 |
| 22 | Sem | Soymida febrifuga | 2,215 |
| 23 | Vel-véngé | Acacia speciosa | 2,108 |
| 24 | Kalai Murdah | Terminalia | 1,974 |
| 25 | Carrúngalli | Acacia sundra | 1,922 |
| 26 | Marda | Terminalia | 1,851 |
| 27 | Erúl | Inga xylocarpa | 1,856 |
| 28 | Perumbé | Prosopis spicigera | 1,471 |
| 29 | Nát Vaddam cottay | Terminalia catappa | 1,395 |
| 30 | Puvu | Schleichera trijuga | 1,353 |
| 31 | Karúvalem | Acacia Arabica | 1,264 |
| 32 | Mullu-vengê | Briedelia spinosa | 1,212 |
| 33 | Sissú | Dalbergia sissoo | 1,182 |
| 34 | Valugum | Feronia elephantum | 1,108 |
| 35 | Chórkalli | Chloroxylon Swietenia | 675 |
| 36 | Palai | Mimusops hexandra | 669 |
| 37 | Ték | Tectona grandis | 659 |
| 38 | Nir Marda | Terminalia | 241 |
| 39 | Someda | Soymida febrifuga | 225 |
| 40 | Kurrentumbi | Diospyros | 203 |
| 41 | Jallari | Vatica | 116 |
| 42 | Kurkuttah | Zizyphus glabrata | 92 |
| 43 | Yellak cadukai | | 84 |
| 44 | Athee | | 80 |
| 45 | Angili | Artocarpus hirsutus | 50 |
| 46 | Valai | | 26 |
| 47 | Miladi | | 20 |
| 48 | Coné | Cassia fistula | 18 |
| 49 | Chittacha | (Vide 7) | 14 |
| 50 | Vadur coomé | Bignonia xylocarpa | 10 |
| 51 | Tumbi | Diospyros ebenaster | 3 |
| 52 | Cuddapai | | 1 |
| | | Total. | 2,45,743 |

Note.—The number of trees furnishing sleepers is not so large as this list indicates, 10 and 27 are *Inga xylocarpa*; 5 and 24 are the same *Terminalia*; and 7 seems to be identical with 49.

It will be seen that by far the largest number of sleepers are obtained from trees of the General *Terminalia*, and *Conocarpus*, Natural Family COMBRETACEÆ, remarkable for the height and size of their trunks, and the toughness of their timber; their durability *under ground* has not been altogether satisfactory, and the Calukai *(T. Chebula)* especially appears to be liable both to the attack of fungi and of the carpenter bee, and ought to be excluded from the specification List.

The LEGUMINOSÆ are next in importance, the trees supplying the wood being *Pterocarpus* (Vengé), *Inga* (Erúl), *Hardwickia* (Acha), and various species of *Acacia*. Well grown timber of these kinds is deservedly prized by the Engineers.

As the Native name frequently applies to a genus rather than to a species, it is very doubtful whether those marked Sál and Pedowk are really the true species, although obtained from trees belonging to the genera *Vatica and Pterocarpus*.

The Railway Engineers generally have most confidence in Sál, Ilúpé, Kar Marda, Véngé, Chella Wunjé: Teak being too expensive for general use as sleepers.

22. NILGIRI SHOLAS.—The increasing wants of the Hill stations, the requirements of the Wellington Barracks, and the assignments to settlers have drawn attention to the necessity of conserving the remaining woods on the Nilgiri Hills. The subject is treated of at length in the Records noted in the margin. The Establishment for supervising the Forests on the plateau, consists of the following:—

G. O., No. 425, 20th March 1860
G. O., No. 1,161, 13th July 1860.

| | | |
|---|---|---|
| Utakamund..... | 2 Overseers. | 7 Peons. |
| Kunúr..... | 1 „ | 0 „ |

These are about to be placed under the charge of an Assistant Conservator.

The Rules approved by Government as applicable to Utakamund, are:—

"First.—The whole of the Shólas, or woods, in the neighbourhood of the station to be absolutely reserved, not only for their beauty, but also from fear of injuring the water springs; their limits to be marked; no private cutters to be allowed inside; old trees to be felled by servants of the department, and brought outside, and to be sold there by public auction. Trees to be planted where required, in vacant spaces.

The reserved woods at Utakamund.

Secondly.—Suitable woods at a distance from the station to be selected and marked out in lots of moderate size; and a number of these lots, amply sufficient for a year's supply, to be put up to auction annually. The Contractor to be permitted to clear the ground entirely within his lot or lots, with the exception of such trees as may be marked by the Conservancy Department, previously to the sale.

Thirdly.—The cleared lots to be planted, as required, by the Conservancy Department.

Fourthly.—No private felling of any kind, or for any person, to be allowed in woods or on land belonging to Government."

23. TEAK.—Teak scantling of large size is becoming more and more scarce all along the West Coast. The fact is, in Malabar, *first class logs* are not easily procurable. This dearth has lead to the employment of other indigenous woods, which previously were in little or no demand. In the Railway Department, much as Teak is valued, it is found to be too expensive for many purposes to which it was formerly applied; and, as is stated in another part of this summary, experiments are now being made with the view of securing suitable and less expensive substitutes. In the building of private houses, the same difficulty is experienced, and builders are having recourse to *Véngé*, *Karamarda*, and the like.

Paragraph 8. Seasoning.

Whilst there is a great want of large Teak logs, there is no lack of small beams and poles.

24. TEAK PLANTATIONS.—The increasing demand for woods, available for Government purposes, renders it of the utmost importance that the various Plantations should be carefully watched and conserved, especially now that the Home Government is looking in this direction to supply her Dockyards. The largest and most valuable Forests are reserved for the purposes of Government, and measures have been adopted not only to prevent inroads upon them with the axe and conflagration, but to watch the growth of the plants and provide against their being choked by the undergrowth which springs up around them. The most important of these Plantations are the "Conolly plantations." These young Forests have been specially referred to in both of my preceding annual summaries, and their value to the State will every year become more perceptible. Hitherto they have been a source of expense, but last year the returns for the first time

| | | |
|---|---|---|
| Expenditure 1859 60 | .. | 5,493-0 6 |
| Income..... | .. | 5,165-2-9 |
| | | 1,672-2-3 |

exceeded the expense of their maintenance: situated as these plantations are on the banks of the Nellambúr river, the value of the timber is enhanced by the fact that it is so easily transported, while the Malabar Forests are so much exhausted. The Forest is of such importance and at such a critical period in its history, that I would recommend that in the absence of the Conservator, the Collector of the district should periodically visit it, and take measures to secure a strict adherence to the regulations laid down regarding it. This course appears to be indicated all the more by the circumstance that the plantation in question was originated by a Collector of the district. These Forests are situated in the Ernad taluq. Their extent has not as yet been definitely ascertained, it has indeed been proximately stated, but it is of the utmost importance that they be carefully surveyed. At present the survey of Wynād is going forward and as at certain seasons of the year it is, I understand, difficult to proceed with it, on account of sanitary considerations, I would earnestly urge that such intervals be employed for determining exactly their extent as well as the leases of land set apart for planting purposes. There is one interesting feature of these plantations which ought to be stated. They are now made use of as Training schools, where the planting system there followed, is taught to subordinates, who are gradually introduced into it. One of these thus taught, has been deputed to the Anamallai Forests, one to North Canara, and two to Mysore.

25. AVERAGE GROWTH OF TEAK.—A knowledge of the rate of growth is the basis of all our systems. We are groping in the dark so long as we are without knowledge on this point. The scale which at present guides our operations is:

| | | | | | | |
|---|---|---|---|---|---|---|
| 10 | years | growth, | 18 | inches at | 6 | feet from ground. |
| 22 | „ | do. | 36 | „ | „ | „ |
| 37 | „ | do. | 4-6 | „ | „ | „ |
| 62 | „ | do. | 6 | „ | „ | „ |
| 93 | „ | do. | 7-6 | „ | „ | „ |

The above figures are taken from a memorandum of Dr. Brandis, Conservator of Forests in Burma, and accords very much with my own observation.

26. BLACKWOOD.—Blackwood seedlings have been planted to the number of several thousands in North Canara and the Nuggur district of Mysore. This wood is largely used in the manufacture of furniture at Bombay, &c. the price has been rising for some years, and it is now nearly the same as that of Teak.

27. AUSTRALIAN PLANTATIONS.—The progress of these plantations having been detailed in a separate Report, I need only state that Overseer Hall, performs his duty efficiently. I have reason to believe that the object of supplying the Wellington Barracks with fuel will be fulfilled. An additional sanction of Rupees 2,500 was made by Government towards an extension* of these plantations. The work is advancing, but meanwhile it would be premature to report further upon it. It is worthy of remark that the pests of our plantations *below* Ghát are, white Ants, spotted Deer and wild Hogs, whilst *above*, devastations are committed perhaps to a greater extent by Rats, Hares, Porcupines, Grubs, and Frost.

G. O. No. 101, 20th January 1860.

*Rats.*—The Nilgiri rat (*Mus providens*, W. E.) is a serious enemy, working underground, eating across the tap-root, and continuing its devastations after the young plant is safe from frost and hares.

*Frost.*—The frost during certain months of the year is detrimental to the young trees, situated in the low lying swampy ground of the Hills, but it seldom affects those planted on the slopes. As a general rule it ceases to act injuriously after the plant has completed the second year. The sign of the young tree being frost-bitten, is a patch or ring of softened and discolored bark with fissures, usually an inch or two above ground, and the leaves dropping off.

*Hares.*—The hares in the clear moon-light nights nibble off the leading shoots, returning again and again until the plant's development is seriously checked, giving it a dwarfed and unseemly aspect. After the young trees, however, have attained a height of about two feet above ground, they cease to be a temptation to the Hares; but other causes of anxiety and sources of injury now present themselves.

*Grubs.*—Various kinds of grubs assail the tender plant, some of them entering from below

* A consignment of Jarrah seed is expected from Australia.

pierce into the heart-wood, and continue their excavations upwards. Many precautions have been taken to render the plantations secure from these sources of injury with some degree of advantage.

The most successful mode of dealing with rats is that of depositing phosphorous pills* at the entrance of their holes. The formula is furnished in Ure's Dictionary of Arts, Manufactures and Mines, is certainly superior to any expedient hitherto adopted to get rid of the nuisance in question.

*Overcrowding.*—The error of crowding the trees too closely when planted, and subsequently of neglecting to thin them after they have shot up, cannot be too strongly insisted upon. Planting operations elsewhere have suffered, and in certain instances have utterly failed from the neglect of pruning and thinning, and trees which otherwise might have developed into first class Timber, have choked each other; the closeness of growth preventing a free circulation of air and an adequate supply of nutriment to the individual plants.

28. Distribution of Tree Seeds.—It is a principle acted on in the department, to send seeds to those quarters, where their growth is probable, and their possession would be esteemed an acquisition.

This principle is specially regarded in those instances, where we have received consignments from distant quarters. This reciprocity of favors operates beneficially, both in a scientific and economic point of view. While this is the case, individuals who thus transmit seeds, should use discretion in selecting such species, as will be likely to prosper in their new habitats. In the course of the year, seeds have been despatched to Scinde, Hongkong, Melbourne and Sydney.

29. Avenues—(A.) The District Engineers have generally nurseries for raising shady trees, which have in several Districts been planted with good effect along the trunk roads. A few weeks ago, the District Engineer of Coimbatore sent three selected laborers to be instructed at the Australian Plantation, in the planting, pruning and trimming of trees. Bungalow Sepoys ought, I think, to be charged with the care and watering of the trees in the compounds of Dâk Bungalows, and the same condition might apply to servants in charge of other public buildings, as Choultries, Soldiers' Rest-Houses, &c.

(B.) *Madras.*—It is admitted to be better to grow trees from seedlings than from branches. The former method is slower, and requires more watching and watering; but the trees last much longer, and are more symmetrical. It is of the utmost importance that the trees planted be under careful supervision, otherwise it will be impossible to ensure their healthy development, and the main objects of the avenue—ornament and shelter, will be lost. It is desirable, therefore, that such measures be adopted as will be most likely to secure these objects. Some progress has, indeed, been made in this direction, the planting of certain portions of the Public roads having been placed under skilled superintendence. A few of the principal Avenues in Madras, adjacent to the Horticultural Gardens, are under the care of Mr. Brown, and the growth of various trees suitable for Avenues will be carefully watched by him. At Utakamund, the planting of the Highways has had a similar advantageous beginning, the road from Utakamund to Wellington being under the immediate superintendence of Mr. W. G. McIvor; while the margin of the lake and the planting of the former Station generally, is under the Improvement Committee.

(C.) *Districts.*—It is my own personal opinion, after travelling through the greater part of the Presidency, that as a general rule, the Avenues of each District should be placed under the Collector. The reasons are, that Engineers are tempted to lop and otherwise injure the trees when they are engaged on works in the neighbourhood; and this, in addition to the immediate damage sustained, operates badly upon the Natives as an example, and therefore renders conservancy under such circumstances difficult. Besides, the Public Works Department complain that their Establishment is insufficient for the permanent management of the Avenues and as it is not desirable to divide responsibility, the plan which most commends itself, appears to be, the reverting to the former system. The Collector also has great influence over the Villagers and has subordinates in every village.

(D.) *Canal Banks.*—The Godavery and Kistnah Channel Banks have been carefully planted by the Officers in charge, and this should be carried out along all the ramifications. The Irrigation and Canal Company are desirous of commencing the same good work and introducing useful trees at once. The Agent of that corporation is now in correspondence with this Office, how to conduct the general measure of planting, through the medium of the Canal Officers.

* "Hog's lard, ground Cocoa-nut and Phosphorus form the most certain bait and poison combined." (Baker's Ceylon, p 109). Care must be take in mixing the Phosphorus, of which very little suffices.

The proposal of planting the Canal Banks is highly to be commended, and the expense will be amply repaid by the increasing value of the timber.

(E.) *Railway.*—The Railway Companies have on several instances applied to the different Public gardens for a large number of young trees, so that I presume, they intend to plant both along the lines and near to the stations; this measure will tend to the comfort of travellers and ensure a partial supply of fuel and sleepers.

30. FIREWOOD.—The consumption of firewood has always been great, inasmuch as it is essential to cooking, and in particular districts the supply has been described by writers as barely sufficient; but the question of supply is one which is now pressing more urgently on the attention of all the District authorities.

In connection with the progress of Railways and the undertaking of large Public Works, the scarcity of fuel is severely felt and my attention is drawn to it *everywhere*. The *bonâ fide* Ryot is understood to have a prescriptive right to the fuel and leaf manure required for his house and field, and an abundant supply of them is obviously beneficial, enabling him to apply the dung of his cattle to fertilize his lands.

The large towns are supplied with firewood by persons who purchase annually at auction, the contract for cutting certain portions of the neighbouring jungle, and the apportioning of woodlands is made with reference to the period when it will reproduce itself. The Contractors are allowed to remove, under regulations, the low bushes and less valuable kinds of trees. A list of reserved trees is published in the District Gazettes, and hung up at the Tahsildar's Cutcherry.

It is customary to cut the wood into billets of 3 or 4 feet length, which are split into two or four pieces according to the diameter, and carried to market, where such billets are retailed and delivered at the door. The price varies exceedingly in different districts and at different seasons; but I may mention that the average has risen about 25 per cent. in most of the large towns within a few years.

This is the fuel used for cooking by Europeans and a large proportion of the Native population, who also use bratties made of cowdung. In Bellary and other barren districts, the firewood chiefly consists of branches of thorny bushes, there being almost a total absence of forest trees.

In such localities, the cost of conveyance and the difficulty of procuring wood is in some cases excessive. Small poles are not to be obtained even for the rafters of huts; the lower fallen leaves of the American aloe come into great use as a substitute for fuel, for which it is not well adapted, containing little combustible matter.

The seignorage on firewood varies in different districts,* and the general regulations also differ with reference to the natural supply of fuel, which is more or less abundant all over the country. After watching the effect of the local rules, which are to a certain extent experimental, we will be able, I hope hereafter, to generalize principles and to arrange the management of fuel, charcoal and bamboos, upon something like a uniform system. In illustration of what is doing in this respect, I have inserted in the Appendix, the Rules in the Coimbatore District, finally passed by the Board of Revenue, the Collector and myself. An addition has yet to be made in regard to charcoal.

* Trichinopoly 4 Ans. per Cartload.†
Coimbatore 5 do. do.
Bellary 4 do. do.
South Arcot 4 do. do.
Utakamund 8 do. do. (cut by the Department.)

PEAT.—On the Nilgiri Hills, turf fuel is now used more than formerly, and it is very desirable that this economical material should be utilized as much as possible, so as to lessen the demand for wood and charcoal.

The peat of the Nilgiris is different from that of Europe, as regards the producing plants. Several specimens were lately forwarded to Dr. Percy of the School of Mines, London, for analysis.

The only other sample which has been submitted to chemical examination so far as I know, was brought from Thibet, by Dr. Falconer.

31. CHARCOAL.—This subject was alluded to in last year's summary, it is one of great importance, and again demands special notice. There is great necessity for insisting on the strictest economy in the preparation of charcoal, as it is, the Native workers have recourse in its manufacture to measures which at once rude* and extravagant. In various parts of the country, there are slight differences in the mode of preparation, but all are faulty and objectionable in an economical point of view. The branches selected for charring are generally those of large, valuable hard-wood trees, which are left to decay. Teak, Blackwood and Erool, being

* Wall's Report on the Silver and Lead ores of Kurnul, recorded in G. O., No. 1040, 27th July 1858.

† About 750 pounds.

always preferred when there is a choice; the charcoal burners, however, are strictly prohibited from appropriating timber of this description, and are only permitted to use the branches when the trees have been felled for another purpose. Various trees, however, are preferred, depending on the purposes to which the charcoal is to be applied. Measures have been adopted towards the instruction of some of the Hill tribes in the art of economical burning, the principal error being in allowing the process* to be performed in the open air, instead of in closed kilns.

Bark Charcoal—used by Dhobees.
Gunpowder† do.—Small Shrubs or herbs as *Vitex* and *Cyanus*.
Charcoal for Iron Foundries—Large pieces of hard-wood are preferred, as those already mentioned.

Charcoal is an article of considerable consumption in the towns, especially at Utakamund, and the certainty of a future supply is attended with some anxiety. It has been proposed to levy a seignorage of one Anna upon the piled parah, and this seems reasonable.

32. Bamboos.—The demand for the bamboo will always be very great. Enormous quantities are brought to the Presidency by Railway, so that the jungles close to the line are rapidly being exhausted. It seems, therefore, advisable that some measures be taken to regulate the cutting, as has lately been done in the case of fuel. The propriety of this may be perceived by the fact that, while in one district they disappear, in the adjoining Collectorate there is frequently a superabundant supply. Throughout Canara, there is a uniform tax of 8 Annas per hundred, and I am of opinion that a similar impost might be made with advantage in other Districts, except in certain localities where for sanitary considerations the thinning of the jungles should be encouraged.

The immersion of bamboos in water and especially in a solution of sulphate of iron, (ಅನ್ನಬೇದಿ. Annabhédi *Tel*) or in lime water, is attended with the best results. The sweet sap is thereby extracted, which, if allowed to remain, is certain to induce rapid decay. When it is intended to split the bamboos for reepers, this should be done before they are steeped in the metallic bath

The coast merchants prefer the bamboos which have been months in the water attached to rafts, these are "*water seasoned*" by being floated to the sea shore down the Nellambur and Sedashegur rivers. The bamboos are often 18 yards long and are brought down in immense floats tied together in bundles of fifty by the root ends which are turned towards the forepart of the float

*Note.*—Teak, Sál, Blackwood, &c. improve by lying in water, or in the soft black mud of an estuary, there is one exception viz. Heddé, (Manjé Cadambé) *Nauclea cordifolia*, which deteriorates from steeping and should be carted to its destination.

33. Fancy woods.—The Forests of Southern India contain a great variety of woods which may properly come under this head; but the markets of Europe are so distant and the cost of freight is so heavy, that few are exported to England and France, save Ebony, Rosewood (or Blackwood), Satinwood and Sandalwood. Occasionally beautiful specimens may be seen, equal to any thing ever made up into furniture in England.

Ebony is chiefly obtained from Coorg and Canara, (various species of *Diospyros*,) and is of a superior description, being perfectly dark in color, smaller pieces are procured from Caddapah, Salem, Nuggur, &c.; but there is no steady demand, though it is a peculiarly fine timber for Cabinet work, and some of it is well veined for ornament.

Satinwood.—I have seen very fine Satinwood at Cotaputty in the Tengricottah táluq of Salem. I fear that a good deal of the oldest and best was destroyed by the Railway Contractors, but this locality is evidently suited for the development of the tree, and I hope that it may yield a supply for the Gun Carriage Factory, where the wood is used for naves of wheels. The timber sells at nearly the same price as Teak and Blackwood and is employed by Cabinet makers. It is singular that this tree was not conserved under the Native Government, whilst Teak, Blackwood and Sandalwood were rigidly protected. Here, it is proper to observe that, we possess a very limited knowledge of the fancy woods, I believe that several varieties were displayed at the Madras Exhibitions, which, if better known in Europe, would be largely employed, as high prices would be given, covering the expense of transport. Their value doubtless will yearly increase as they become better known to foreign Timber merchants.

34. Dyewood.—*Sappan tree.* Some efforts have been made to extend the growth of this plant, by sowing the seeds on the bank of the river near Shedashegur A packet likewise was forwarded to Scinde for trial on the bank of the Indus.

---

* Circular No. 10 in Appendix explains the proper mode of manufacture.

† Also Madar, *Calotropis gigantea*, and *Parkinsonia aculeata*.

Nearly all the straight pieces are sent to England and the crooked roots to China, the latter undoubtedly produce more dye in proportion.

35. CINCHONA.—An attempt sometime ago made to introduce this invaluable Plant into India, failed. The Calisaya plants brought by Mr. Fortune, died on their way from Calcutta to Darjeeling. The success of the Dutch in Java has been very encouraging, and if the efforts about to be made in this Presidency are attended with similar success, no ordinary benefit will accrue to the country. The great expense of Quinine and the rapid disappearing of Cinchona trees in South America, renders such an experiment of the utmost interest and importance The arrangements made by Mr. Markham for the transmission of the plants from Peru to this country have been completed, and are in every way judicious. Taking advantage of the experience and success of the Dutch in Java, a careful comparison has been made between the soil and temperature, in which the Cinchonas have thriven there, and the climate and geological conditions of various parts of the Western Ghâts. There are certain important points connected with the growth of this plant, as the rain fall of which we are ignorant, but so far as our knowledge extends, sites have been proposed, so as to correspond as nearly as possible with the soil and climate of the Java plantations. The preparatory steps necessary for the safe transport of Mr. Markham's collection from Calicut or Madras to the Nilgiris, have been taken by Government,* and Mr. W. G. McIvor selected for preparing sites and carrying out the preliminary work. The conduct of the Dutch in raising cuttings and protecting them from the direct rays of the sun has been noted, and if necessary, their example will be followed.

* G. O., No. 1220, 18th Aug. 1860.

At present, the experiment is to be confined to Ceylon and the Nilgiris ; a few plants being entrusted to Mr. Hall at Kunur, and Mr. New, at Bangalore, who will watch their progress in his Conservatory.

36. TEA.—Southern India promises well to afford favorable sites for the growth of Tea. Numerous experiments have been made and attended in several instances with marked success, as regards the healthy growth of the plant. In order, however, to complete the experiment and allow the Tea grown in the Presidency, to occupy its proper place in the market, it is necessary that the art of manufacturing it, should be introduced either direct from China or from Government Plantations in the North Western Provinces. Unless something of this kind be done, Tea grown in Southern India, cannot attain that commercial value which it might probably acquire, were it generously taken up. The Tea shrub is remarkable for its hardiness. The cultivation extending over a great breadth of latitude. It prefers a climate where the mean temperature is from 67° to 73°. This valuable plant may be seen at several places on the Nilgiri and Pulni Hills, in Coorg, on the hill sanatarium of Nundidroog, on the Shervaroy and Bababooden Hills, at Curtallam, and in various parts of Travancore. Although Tea plants have been introduced and are growing at each of these localities, they are not all equally promising, and the place in the market which any of them is to occupy has not yet been ascertained, and cannot be so until the introduction of competent manipulation completes the experiment.

G. O., No. 1425, 24th August 1860.

37. COFFEE.—Applications for Forest land are numerous. The settlers usually select localities in heavy jungle, which are in the immediate neighbourhood of Trunk roads ; and if the timber appears to be valuable, the Collector refers the application to this office for an opinion.

It is of the utmost importance that no encroachments should take place, boundary lines and trenches ought in every instance to be carefully laid down, so as to avoid subsequent misunderstanding. The Government is establishing rules, which will enable every one clearly to understand the exact limits of his property, and what penalties are incurred, if they are trespassed.

38. POTATO.—It is of great importance that the cultivation of the Potato be carefully attended to, and soils best adapted for its healthy and vigorous growth selected. In Bengal, for the last six or seven years, this esculent has been deteriorating, and it was found necessary to apply* to this Presidency for a supply of seed Potatoes, the tubers being larger, firmer and of better flavor on our mountain ranges, than in the Sikkim Himalayas.

* Pro of Board of Revenue, dated 7th May 1859.

The cultivation is rapidly increasing in Mysore and on the Nilgiris, and the demand for them is not confined to the European, although at first they are not relished by the Natives ; in a short time the taste is developed and they are prized, not only because they are palatable and nutritious, but because they are profitable.

39. PROGRESS OF THE DEPARTMENT.—At the close of this Report, it may not be out of place to draw attention to the fact, that since this Department was instituted three years ago, many changes have occurred, and the field of operation has gone beyond the original scheme. In this way difficulties have sprung up which could not have been anticipated, and defects therefore can be pointed out, which, while matter of regret are only the natural consequences of circumstances beyond our control.

The Establishment is now too limited to embrace all the duties which at present devolve upon it. The extent of country to be conserved is out of proportion to the means placed at the disposal of the Department for its protection. Originally it was not contemplated that we should organize a Police Establishment, as it was understood that the Forests would be under the same protection as other public property.

The number* of sanctioned Peons is quite inadequate, and the Forests are consequently only partially protected. It was not expected that the Police should enter the Forests and extend their surveillance to the growing trees, but it seems only reasonable that when the Timber has been felled, marked, and taken out of the Forests, the Mofussil Police should restrain theft, and that they should report any transgression of the Forest rules coming within their knowledge, in the same way as they would warn a householder of the insecurity of his premises, or the vicinity of robbers, and so forth. It is only this *general* care that I seek, and if it be not extended to Government Timber, as to other property, public and private, the necessary result must be a considerable increase to my watching Establishments.

* 53 Permanent for the whole Presidency.

40. FOREST ASSISTANTS.—I have reason to be satisfied with the exertions of my Assistants; during my absence, Lieutenant Beddome has been nominated* to act for me, and Captain Brine who, conducted the operations in the Pamnbem channel succeeds to the charge of the Anamallai range.

* G. O. 17th August 1860

In a separate letter, I have recommended that the valuable Teak forest on the confines of Wynád, should be placed under Captain Gib, and I hope that this arrangement will take place immediately. The range will extend from the border of Coorg to Gundelpett.

WYNAD.

One great want of the Department is, an additional Assistant, who, while learning his duty, could afford useful aid and afterwards be competent to fill any unexpected vacancy (such as those which have occurred this year). Two hundred Rupees staff salary would be sufficient. The advantage of a trained Assistant on emergency is self-evident.

41 OVERSEERS.—There is still great difficulty in obtaining the services of robust men, possessing all the requisite qualifications indicated in previous Reports. If the sanctioned amount allowed for the Department had not been expended, I would have recommended the location of Overseers at Kurnúl, Kotagiri, &c.

42. EXPLORING TOURS.—During the past three years, annual tours of about nine months' duration have been made, during which a very large portion of the Presidency has been traversed, and all the more important Forests have been to some extent explored.

Considerable additions have been made to our knowledge of the interesting and important region of the Anamallais and confines of Travancore, by a second exploring tour of Lieut. Beddome, the Report of which has already been† published. The Sál Forests of Gumsúr were visited by me in the early part of last year, and an extract from my Diary is contained in Appendix G. When Mr. Beddome has visited the Nala Mallai range in Kurnul, there will remain no extensive tracts of importance wholly unexplored The further examination of these will be undertaken, as circumstances permit.

† G. O No. 956, 9th June 1860.

43. SELECTIONS FROM THE FOREST RECORDS.—The Government have lately sanctioned the reprinting in a portable form, of a Selection of the Miscellaneous Reports on various subjects, connected with the Vegetable Kingdom, which have been printed in loose sheets, during the last few years For some of these, inquiries are frequently made at this Office, and being scattered through Government Records of various years, they are not easily referred to. I hope to pass this compilation through the Press, during my leave to England,

44. PUBLIC GARDENS.—There has been no change in the superintendence of the three

G. O., No. 323, 15th March 1859.
„ No. 761, 15th May 1860.

Public Gardens, which as usual have formed the subject of separate* Reports. That for Utakamund has been recorded as per margin.

The subjoined tabular statement is a return of all the plants, and packets of seeds sold and distributed during the two last years. The aggregate amount in each institution is considerably increased.

---

*Return of Plants, Seeds, &c., sold at the Government Gardens.*

| Gardens. | 1858-59. | | | | | 1859-60. | | | | | Decrease | Increase. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fruit Trees and shrubs. | Timber trees. | Shrubs and flowers. | Parcel of seeds. | Total. | Fruit Trees and shrubs. | Timber trees. | Shrubs and flowers. | Parcel of seeds. | Total. | | |
| Madras..... | 71 | 740 | 1,566 | 133 | 2,510 | 69 | 821 | 2,781 | 109 | 3,780 | 0 | 1,270 |
| Bangalore..... | 77 | 9 | 586 | 305 | 979 | 918 | 114 | 519 | 527 | 2,078 | 0 | 1,099 |
| Utakamund..... | 287 | 3,350 | 4,376 | 170 | 8,183 | 1,336 | 12,892 | 2,613 | 170 | 17,011 | 0 | 8,828 |
| Total... | 435 | 4,099 | 6,530 | 608 | 11,672 | 2,323 | 13,827 | 5,913 | 806 | 22,869 | 0 | 11,197 |

45. Manual of Indian Botany.—I know of no book more wanted: there are many inquiries for such a guide amongst the increasing number of Europeans, who come out to this country. The characters of the *genera* of plants should be abridged, and the economic uses introduced, of which our knowledge was much increased by the successive Madras Exhibitions. The work should be printed in small type, so as to form a book of easy carriage and convenient reference.

I have occupied myself during occasional leisure hours, in preparing a Manual of this kind, as directed in G. O., No. 767, 10th June 1857. But as the duties devolving upon me increased, the time available for this collateral occupation has unavoidably diminished. I take home the materials, and hope to progress with the work.

46. Herbarium and Library.—The Department is now so developed as to render it of importance, that a Herbarium and Library for reference be established and attached to the Office. Already a nucleus of both of these is in existence, and it only remains that that they be fully recognized and such measures adopted, as will render them of real and permanent use to the Department. It is believed, that by judicious arrangements, considerable additions might be made from time to time both to the Library and Herbarium. Important contributions are periodically received from Sir W. Hooker, Director Royal Gardens, Kew, from Dr. Thomson, Calcutta, and regular communication is kept up with other centres of influence. A few purchases would now be advantageous, and I propose seeking permission to make them as occasion arises.

47. Office Establishment.—The duties have been carefully performed by Native Surgeon, F. Appavú, who has labored well to get the Accounts into a proper system. The utmost simplicity compatible with accuracy is necessary in the Financial arrangements, as Writers and Accountants cannot be persuaded to remain in the Forests, and the system existing previous to the formation of the Department was very defective.

H. CLEGHORN,

*Conservator of Forests.*

* The Report of the Lál Bágh, Bangalore, is forwarded to the Commissioner of Mysore, and the Annual Report of the Madras Gardens, is published by the Committee of Management.

# APPENDIX A.

## NORTH CANARA.

I have the honor to submit herewith my annual Report, with the accounts enclosed for the official year 1859-60.

2. The Collector having already furnished the Account Current up to 31st December 1859, I have only to submit the accounts for the remaining portion of the official year.

3. For the purpose of bringing the operations of the entire year under one view, I have drawn up another Account Current from 1st May 1859 to 30th April 1860. In this, all the items belonging to South Canara, which were entered before the division of the District, are thrown out. A memorandum of Cash is also appended.

4. This account shows an income of Rupees 2,00,767, with an expenditure, including the cost of the fixed Establishment, of Rupees 57,664, thus leaving a profit of Rupees 1,43,103.

5. *Memorandum of Wood unaccounted for.* This exhibits the balance of logs in store last year, the supply and disposal during this; with balance now on hand. Last year the estimated value of timber on hand was put down, at Rupees 1,10,771-12-0; while now, there is a balance of the value of Rupees 1,32,767, exceeding the former by Rupees 21,996. This difference is not caused by having put a higher value on the timber than was done last year, but by having a greater quantity in store.

6. I beg now to offer some remarks about Forest operations in particular. In doing this, I shall try to compare the works, Establishment, Income and Expense of previous years with those at present.

7. Hitherto it has been customary to review the Forest operations under two heads, viz., *Amani* and Contract works. Strictly speaking, all works are *Amani* or all works are done by contracts; which means, every one who works is paid for cutting, squaring, carting, (or floating below ghauts) by measurement. The only difference is that the contracts above the ghauts (where all timber is carted) are small, lasting for a few months only; whereas those below the ghauts are necessarily large, extending over several years, and must therefore be always reviewed separately.

8. There has been an increase of work, which necessarily entailed also an increase of the Establishment. Previous to introducing the system of working the jungles ourselves and selling the timber at regular Depôts by public auction, the establishment had only to mark trees in the jungles, which were then sold standing in large lots. After the Contractors had cut the logs, the establishment had to stamp them on removal and in general, to look after the Contractor's works. This was easy and much of it could be done, and in reality was done by Peons. But now, trees are cut by Contractors for Government. They have first to be marked, and when the logs are cut and squared, they have to be numbered, measured, and carted to depôts. At the depôts they have to be sold, delivered, and stamped. This is additional work and for the time being, additional hands are required, which have been called "Temporary Establishment."

9. The following table shows what has been the additional work of the Establishment, leaving the large contracts out of the question.

| Tálúqs. | No of trees cut | Contents. | | | | | Brought to Depôt | | | | | Remaining in Forest | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Logs. | Candies | Qr. | G. | T. | Logs | Candies | Qr. | G. | T. | Logs. | Candies. | Qr. | G | T. |
| Ankóla... ... | 200 | 452 | 535 | 1 | 3 | 19 | 284 | 284 | 0 | 3 | 13 | 168 | 251 | 1 | 0 | 6 |
| Yellapúr. ... | 3,696 | 7,490 | 10,128 | 2 | 3 | 12 | 7,087 | 9,296 | 1 | 2 | 16 | 403 | 832 | 1 | 0 | 16 |
| Sundah... ... | 3,191 | 6,433 | 6,381 | 2 | 2 | 16 | 6,373 | 6,293 | 2 | 3 | 9 | 60 | 87 | 3 | 4 | 7 |
| | 7,087 | 14,375 | 16,047 | 3 | 0 | 7 | 13,744 | 15,874 | 0 | 4 | 18 | 631 | 1,171 | 2 | 0 | 9 |

It thus appears, that 7,087 trees were cut; and 15,874 candies were carted to depôts, under the immediate superintendence of the Establishment. Add to these 1,571 logs containing 1,426

candies of old dry and fallen teak, and junglewood collected, and now at the depôts; we have a grand total of 17,300 candies of work begun and finished during the year It is clear that the above work adds also to the usual expenditure in this instance, the 17,300 candies cost Government, Rupees 22,786-14-4, or at an average, Rupees 1-5-3 per candy nearly the same as last year, when the average was Rupees 1-6-2. Logs cut last year, but carted to depôts during this, are not included in the above calculation, nor are those now prepared, but still in forest

10. By comparing the receipts and expenditure of the last seven years, as per table below it might be inferred that the new system in operation during the last three years does not show much difference, and even what it shows, might be said to be in favor of the old system.

| Official year. | Receipts. | | | Expenditure. | | | Remarks. |
|---|---|---|---|---|---|---|---|
| 1853-54 | 144,235 | 4 | 9 | 50,370 | 9 | 0 | Years under the old system. |
| 1854-55 | 85,014 | 5 | 7 | 37,310 | 6 | 8 | |
| 1855-56 | 150,609 | 8 | 0 | 32,647 | 8 | 4 | |
| 1856-57 | 160,639 | 6 | 4 | 44,490 | 15 | 1 | |
| 1857-58 | 70,656 | 10 | 7 | 22,869 | 3 | 2 | Years under the new system. |
| 1858-59 | 100,604 | 10 | 9 | 34,325 | 7 | 9 | |
| 1859-60 | 206,683 | 7 | 8 | 56,959 | 14 | 3 | |

11. This falling off (except for the year under report) is not due to the system, but to our Contractors not bringing timber to the coast in 1857 and 1858. Consequently, below the Ghauts there were less receipts and expenditure; but above, the change of the system told immediately. The subjoined table in which the Revenue is divided for the upper and lower Tálúqs will exhibit this.

| Official year | Receipts in North Canara | | | | | | South Canara | | | Total. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Upper Taluqs | | | Lower Taluqs. | | | | | | | | |
| 1853-54 | 29,368 | 8 | 9 | 1,14,866 | 12 | 0 | ... | ... | ... | 114,235 | 4 | 9 |
| 1854-55 | 12,913 | 1 | 7 | 64,990 | 6 | 0 | 7,110 | 14 | 0 | 85,014 | 5 | 7 |
| 1855-56 | 19,050 | 15 | 8 | 1,29,369 | 13 | 4 | 2,188 | 11 | 0 | 150,609 | 8 | 0 |
| 1856-57 | 7,242 | 10 | 2 | 1,52,016 | 9 | 0 | 1,380 | 3 | 2 | 160,639 | 6 | 4 |
| 1857-58 | 13,265 | 6 | 2 | 55,208 | 7 | 11 | 2,182 | 12 | 6 | 70,656 | 10 | 7 |
| 1858-59 | 59,756 | 2 | 6 | 35,569 | 13 | 4 | 5,278 | 10 | 11 | 100,604 | 10 | 9 |
| 1859-60 | 147,348 | 7 | 0 | 59,335 | 0 | 8 | ... | ... | ... | 206,683 | 7 | 8 |

It appears that the revenue in the upper Tálúqs, previous to introducing the *Amani* system was very small, and that the greater part was derived from the Coast sales, &c.

12. The *Amani* system above the ghauts may be said to have been in fair operation during the last three years (the fourth year is not counted, being the year in which little could be done on account of the opposition experienced from the wood Merchants.) The profits of a year's work are always shown in the year following. So we have for the work

Of 1857 the Revenue in 1858.....Rs. 59,756
„ 1858 „ „ „ 1859..... „ 147,348
„ 1859 we have stock on hand for about... „ 87,592

The average revenue from the upper Forests for the four years, from 1853-54 to 1856-57, is little more than Rupees 14,668, while the average of the last three years (excluding the value of present stock on hand), is Rupees 73,190, or five times greater.

13. The higher receipts are not the only benefit of the new system; but there is also less waste of timber On looking over the old accounts, it appears, that about 20,000 trees annually were sold out to Contractors. (The highest price obtained was Rupees 1¼, and the lowest only 2 Annas per tree). The trees then cut were either very small, or if large, only the finest logs were taken, and the rest of the wood was left to burn; now we cut all that is useful and collect the odds and ends also.

14. As remarked above, the receipts have fallen off in the lower Taluqs, because the Contractors either entirely or partially failed to bring timber in time. What we had, was mostly

defective or small, and therefore the deliveries to the Bombay Dockyard have much fallen off. In former years, from 60,000 to 100,000 Rupees worth of timber was selected; but during the last 2 years the value of the selected Teak did not come up to Rupees 30,000, and in this year only to Rupees 10,000.

15. Now as Gúnd is opened up, we shall get large and fine timber in future, and the Bombay Government instead of going into the market for it, may have their requirements met from our Depôts.

16. The average receipts derived from the upper and lower Forests having been given, I beg to analyse the expenditure in the same manner:—

| Official year. | Expenditure in North Canara | | | | | | South Canara. | | | Total. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Upper Forests. | | | Lower Forests. | | | | | | | | |
| | Rs. | A. | P. | Rs. | A. | P. | Rs. | A. | P. | Rs. | A. | P. |
| 1853-54 | 1,899 | 4 | 10 | 48,471 | 4 | 2 | .... | ... | ... | 50,370 | 9 | 0 |
| 1854-55 | 3,075 | 6 | 9 | 34,017 | 15 | 4 | 217 | 0 | 7 | 37,310 | 6 | 8 |
| 1855-56 | 3,371 | 2 | 8 | 29,276 | 5 | 8 | .... | ... | ... | 32,647 | 8 | 4 |
| 1856-57 | 3,614 | 15 | 4 | 40,875 | 15 | 9 | .... | ... | ... | 44,490 | 15 | 1 |
| 1857-58 | 12,560 | 4 | 3 | 10,000 | 2 | 0 | 208 | 8 | 0 | 22,869 | 3 | 2 |
| 1858-59 | 24,956 | 14 | 3 | 8,305 | 10 | 6 | 900 | 15 | 7 | 34,325 | 7 | 9 |
| 1859-60 | 40,965 | 0 | 4 | 17,974 | 13 | 11 | .... | ... | ... | 56,959 | 14 | 3 |

This table shows that in the four years previous to the introduction of the *Amani* works, there has been very little expense; while the heavy items were all incurred below the ghauts The expenditure bears a fair proportion to the receipts. Above the ghauts it has been increasing, in the same manner as did the receipts. On the Coast the expenditure decreased, as did also the revenue (caused, as already remarked by the failures of Contractors). This table will also show that averages struck over the seven years mislead; but if the comparison be made between the year previous to, and that after the jungles were worked by Government, it will give a more correct result.

| | Rupees. |
|---|---|
| The average expenditure in the upper Forests of the first 4 years, is ..... | 2,990 |
| The average expenditure of the last 3 years ..... | 26,160 |
| In the table of receipts it has been shown, that the average revenue for 4 years, was ..... | 14,668 |
| Do. expense do. do. as above..... | 2,990 |
| Profit, Rupees... | 11,678 |

If the same is calculated for the 3 years under the new system, the result is:—

| | Rupees. |
|---|---|
| Average receipts for the last 3 years..... | 73,490 |
| Do. expense do. do. as above..... | 26,160 |
| Profit, Rupees... | 47,330 |

Thus exceeding the former Profit, by Rupees 35,652 annually. By comparing the works done in the above seven years, it just turns out, that in those years in which business went on well above the ghauts, the Contractors below did not bring timber; and in those years when the Contractors worked well, the *Amani* system above was not yet introduced.

Assuming, however, that both the works above and below the Ghauts go on satisfactorily, the higher average of the expenditure of both must be taken, to arrive at an approximate estimate for future years, thus:—

| | Rupees. |
|---|---|
| Average expenditure above the Ghauts and under the *Amani* system..... | 26,160 |
| Do. below the Ghauts, when Contractors have done their work ..... | 33,172 |
| Total average Rupees... | 59,332 |

On the other hand, the average receipts of those years may safely be taken, as below :—

| | Rupees. |
|---|---|
| Average receipts on the Coast, when Contractors brought timber ..... | 1,15,310 |
| Do. above the Ghauts, under the *Amani* system ..... | 73,490 |
| Total..... | 188,800 |
| Subtracting the expenditure..... | 59,332 |
| The average annual Profit will be.... | 1,29,468 |

I have only to remark, that any mistake in the above calculations will lie rather in the average receipts, having been taken too low for the future.

17. *Sandalwood* cut and prepared in Bilgy and Súndà talúqs, was sold for Rupees 7,824-9-1. There is about the same quantity cut and stored at Sircy which will be prepared into billets during the monsoon, when the Establishment has less work. I did not show this in the Memorandum of wood unaccounted for, as the quantity now at Sircy is only roughly cut and can neither be measured nor weighed.

18. *Reckanasta or stunted Teak and Jungle wood.*—Last year we had 10,300 pieces, containing 2,400 candies; they were sold for Rupees 3,382. This year we have 12,846 pieces, containing 3,695 candies, which will be disposed of next season. Jungle places taken for permanent cultivation, are chiefly in Yellapúr talúq, where 77 spots (area 1,031 acres) have been cleared during the year, at a cost of Rupees 698-10-0. Besides the revenue from the wood, these places will henceforth yield annually Rupees 1,306-12-6 in Land revenue.

19. *Seignorage account.*—This shows an income of Rupees 4,700-10-2; chiefly collected from Villagers at 8 Annas per tree. In *talúqs* where there is no Establishment, extra hands are required for this, and seignorage *Gúmastahs* on Rupees 5, are appointed for the fair season. Inland the *Patells* are ordered to superintend the cutting, according to the Permits, and get a fee of 1 Anna* for each tree marked.

20. *Bamboos* pay now a seignorage of 8 Annas per 100, throughout. There are three items in the Account Current, taking the first only, viz. Bamboos to villagers, it is shown that they have paid 868-7-0 for an article which was formerly free. This amount is collected from the villagers on the frontier, or from persons living in towns, for Ryots who live in the jungles, do not pay for those used in building their huts.

21. *Firewood account.*—If compared with those of previous years, this shows a decrease of income. It is, however, only apparently so. Above the Ghauts we received nothing at all, the Dharwar forests were thrown open (of which the *Desais* or *Inamdars*, who had some forests on their *Inams*, chiefly availed themselves) and so no one required this article from us. The Dharwar forests being now closed again, it is very likely that next season, there will be calls for this article.

22. *Billet-cutting*, from the Kanagalu† trees was stopped last year, but 6,284 defective jungle trees of 43 kinds in six different jungles were marked and sold by auction, in six lots. In the aggregate, Rupees 1,715 were realized. The purchasers were permitted to cut up the wood in any shape they pleased, but have to pay, besides the jungle *Darkhast*, an additional 2 Annas for every candy of wood cut up for building purposes, and 12 Annas for every ton of firewood. Two years were granted for the work. One for working in, and the other for working out of the forests. There are now cut 5,928 pieces containing 2,706¾ candies, and 124,000 round billets of firewood, the produce of 5,191 trees. The result is as under :—

| | | | | |
|---|---|---|---|---|
| 5,191 trees cost in proportion to the whole..... | Rupees | 1,406 | 11 | 0 |
| 2,706¾ candies at 2 Annas ... ... ..... | „ | 338 | 5 | 0 |
| 124,000 billets of firewood, about 372 tons ..... | „ | 279 | 0 | 0 |
| Rupees... | | 2024 | 0 | 0 or 6¼ As. per tree. |

* This was an Experiment agreed upon by the Collector, Sub-Collector and myself, and which Mr. J. D. Robinson reported as working well

† Kanagalu is *Dillenia pentagyna*, this tree was in great request by the Bombay Merchants, from the wood splitting easily.

The benefit consists not only in getting a small value for wood, which was formerly thought useless, but in saving the good trees, especially the Kanagalu which has been nearly extirpated. The ultimate result is a profit, but also an additional work for the Establishment.

23. I have now marked 5,000 other defective jungle trees for next season; but the present batch is somewhat better, having some good trees among them. They will be disposed of in the same manner as were the above.

24. *Contracts and Contractors.*—The present state of the works of each Contractor, is as follows:—

1. *Messrs. Brice and Co.'s* contract for 2,500 jungle trees for Railway sleepers, ended 31st December 1859. The Forest work was finished within the prescribed time, but the sleepers have not yet been exported by sea. Seignorage due has been paid also. The contract is therefore finished

2. *Pondshenwi* for conveying 3,747 Teak from the Sunksal jungles to Gungavali, had two years time for his work, ending 31st March last. Of 6,217 logs (the produce of the above) delivered to Contractors, he brought 3,065 within the stipulated time. The balance (3,151 logs) remain to be brought.

Considering the very large number of Logs to be conveyed from the ghauts to the coast in two seasons, and the otherwise satisfactory working of the contract, I recommended an extension of time till February 1861, within which time the Logs can be easily brought down, being now all collected near the river ready for floating.

3. *Wishwanatha.*—Contractor for conveying 2,000 jungle trees from the Sulaghin forests to Sedashigur. Two years of the three granted for the work, have now passed without a single log arriving at the depôt. In my last annual Report, I stated that "this work was in a very backward state." This is now much more the case, and the chances of the contract being fulfilled in time, are much diminished. However, the Contractor assures me, that he will not fail to bring the whole next season.

4. *Mr. Pinto,* contractor for 2,000 Teak and Blackwood trees from the lower parts of Gúnd, has his work in an advanced state. He has now collected 2,102 logs, of which 502 have already arrived at Sedashigur.

5. *Venktesha Prabhoo's* contract for Shivapur teak has been annulled, and the balance of the logs in the Forests (2,268) has been given out to a new contractor, Mr. Pinto. Two years, ending 31st March 1862, are granted for the completion of the work.

The terms for Venktesha Prahboo's contract were

For selected,.....Rupees 2-6-7 per candy—For rejected Annas 2-7
Mr. Pinto's terms are, „ 2-5-9 do. do. „ 2-8
Decrease..... 0-0-10 Pie, Increase „ 0-1 Pie.

From this it would appear that the present terms are lower; considering however, that 775 logs were in the Kalanady, and about 400 are nearly brought down to the foot of the Shivapur ghaut, on which the new Contractor will have less expense, the terms are in reality much higher. The above 755 logs have arrived at the depôt.

25. *Teak Planting* has been stopped from want of funds; 7,000 seedlings were raised last year. The expense was rather high, considering the small number of seedlings, however the same number now will, I hope, not cost half of what they came to last year.

The planter Abreo* has returned from Nellumbúr plantation. Want of funds precluded me from spending money on preparation of ground to receive seedlings. The time has now passed and the work on a larger scale is therefore necessarily deferred to next year.

26 *The present Establishment* numbers 51 persons, exclusive of those in my Office, and are classed as under.

| Establishment. | Overseers and Subs. | Mootsadies and Gomasthas. | Peons. | Total. |
|---|---|---|---|---|
| Fixed or sanctioned ..... | 3 | 10 | 16 | 39 |
| Temporary..... | 0 | 0 | 12 | 12 |
| Total..... | 3 | 10 | 28 | 51 |

* Having been fully instructed at the Conolly Plantation, I trust that he will introduce the system successfully and economically.—H. C.

Temporary hands employed by myself, are not included here, as they are required for a few months only; whereas the above are entertained throughout the year.

Statement of wood unaccounted for shows, that about 48,000 candies of timber came to, and were taken from the depôts during the year. Besides these, there have been at least 20,000 logs, which had to be numbered, measured and stamped, such as the stunted teak, defective junglewood, and odds and ends, which cannot be exhibited in the memorandum. This requires hands, and time.

We have now 11 Depots in 4 Taluqs: considering that 1 Peon at least is required to watch the timber; 11 men are thus employed. On the coast (Sedashigur and Gungawalli) one man at each place is scarcely enough, as there, during the nights, continual attempts are made to steal teak, which is easily floated off to outlying Pattimars. From all this, it will be obvious that the Establishment is small compared with the work.

Another cause which reduced the effective strength of the Jungle establishment, is sickness. During the year under report, sometimes nearly half the establishment was laid up with fever, and one man died of it. The same was the case with workmen; several died of cholera at Kulgi and the consequence was, that those who remained unaffected ran away from the work. Of 190 coolies at Kaneri, no less than 35 were sick for a long period.

In conclusion, I am thankful to state that my health has been very good, during the whole year.

I have the honor to be,

Sir,

Your most obedient Servant,

S. MULLER,

SEDASHIGUR, 21*th May* 1860. *Asst. Conservator of Forests.*

NOTE.—This report conveys some idea of the extensive operations in North Canara, which (from *three* visits of inspection I can testify,) require great physical exertions and incessant vigilance. Allowance must be made for Mr. Müller's difficulty of writing in a foreign language.—H. C.

---

# APPENDIX B.

## SOUTH CANARA.

The annual Report on Forest Revenue being now due, I have the honor to forward an Account Current, showing the transactions of the South Canara Collectorate, during the past official year 1859-60.

2. The account I now send, though referring to South Canara only, has one item of Receipts, and another of Charges, appertaining to North Canara. I refer to the sums marked A and B. The Bills for the sums so marked, were received from Mr. Müller, the Assistant Conservator, and admitted in the accounts of this District for January, as the accounts for North Canara had not been then regularly opened.

3. The revenue in this District is a mere trifle, as compared with that of North Canara; and no remarks are necessary on the items comprising it for the year under review, save that for Sandalwood stills. The increase in this item over the revenue of last year, is due to the whole rent being credited to Forest revenue, instead of as before to Mótarfa. I think the present mode of supplying the workers of these stills with firewood, is a mistaken one. Instead of assigning to each still a certain area of Forest, I would make them purchase their firewood at the same rate as other parties do. They are nearly all Mangalore merchants who make the oil for export to Bombay; and I do not think they are entitled to any special privileges in the way of firewood. Any additional cost in the preparation of oil, by putting the supply of firewood required in its manufacture on a proper footing, will fall on the consumers, who are well* able to pay the charge, as the article is a luxury, not a necessary.

* The Collector's suggestion was at once adopted.—H. C.

4. Mr. Thompson, the Overseer, has addressed me on the subject of renting out to Contractors the privilege of cutting in the Government jungles, and transporting by water from Bantwal, firewood for use in Mangalore town. I think this is a most advisable proceeding,* and I shall endeavour to get contracts, as the town is now mostly dependent for this necessary on Bekal. A supply from Bantwal will lower the present market price, which is high.

5. I beg to forward a receipt, to show that the whole of the Revenue borne by the Account Current, has been duly credited to Government in the year under report.

I have the honor to be,

Sir,

Your most obedient Servant,

MANGALORE, 14*th June* 1860. (Signed) J. FRASER, *Collector.*

---

# APPENDIX C.

## ANAMALLAI RANGE.

I have the honor to forward the annual Accounts of the Anamallái Forest, for the official year 1859-60, countersigned by the Collector of Coimbatore, according to E. M. C., dated 12th of November 1857, No. 1153, paragraph 9.

2. The two first items on the credit side, are for timber sold in 1858 and 1859, to the Bombay Dockyard. The next item, viz., Rupees 52,657-1-0 is for the Teak planks cut last season and which I handed over to the Dockyard Agent last February. In addition to this, the sum of Rupees 15,033-0-7, has been realized during the year by the sale of timber at public auction, and by private sales to the Department Public Works and Railway Departments. These sums added together, give the amount of Rupees 67,690-1-7 as the receipts of the year; whilst the expenditure has been Rupees 12,592-12-9 exclusive of the Pay of the Establishment, which amounts to Rupees 9,891-12-7; making in all, an expenditure of Rupees 22,484-9-4.

3. Owing to the impossibility of procuring many axemen in the past season, very little timber has been felled; this, however, has been advantageous in one way, as it enabled me to employ the elephants in getting out much of the old timber lying about the forests. The sum of Rupees 15,001-0-11 above alluded to, has chiefly been realized by the sale of logs, heads and butts, that have long been lying about in the forest. In addition to this, an enormous amount of the outlying timber has been brought to the head of the timber slip, and much more to the various depôts at the sides of the cart road; amongst this latter, I may mention all the large logs that were outlying between the cart road and the bungalow station of Tunacadavú.

4. Regarding the items on the expenditure side of the account, I have only to mention that the rate of cart hire above ghát this season, has been increased from Rupees 2 to Rupees 2-8-0 per plank; the particulars of all these items have been reported from time to time in my monthly reports, and I have nothing further to add respecting them. The Mulcers have commenced sawing in the Forest this season, they are as yet very rough at the work, and very irregular in their attendance. I hope, however, to induce some of them to become permanent sawyers; they are, as you are aware, a wild unmanageable race, and when they have earned a few Rupees, they generally refuse all work, until they have spent them.

5. A Peon has been trained to planting at Nellumbúr, and I hope to commence the formation of a small Teak plantation immediately. The want of labor I expect will, as usual, be my chief difficulty.

6. Memorandum No. 2, has been carefully prepared, as regards the timber remaining in the Forests, there is not much now outlying in the jungles. 129 logs and heads are all that we could find in the dry season after the fires had bared the forest: these have all been stamped, numbered, and brought to account in this memorandum.

---

* A contract has been given, the trees being first marked in the Sulia Jungle, by Mr Thompson.—H. C.

7. The following is a Comparative Statement of Teak timber supplied to the Bombay Government for Dockyard purposes, in the year 1858-59 and 1859-60.

*Comparative Statement of Teak Timber supplied to Bombay Government for Dockyard purposes, in the year* 1858-59 *and* 1859-60; *showing the increase or decrease in the number of planks, quantity and class delivered, and the amount realized in each year, the rates being determined by the Collector of Malabar, from the market valuation.*

| For the year 1858-59. | | | | | | | | | For the year 1859-60. | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. of Planks. | Class. | Quantity. Kolls. | B. | V. | Rate per 100 kolls. | Amount. Rs. | A. | P. | No. of Planks. | Class. | Quantity. Kolls | B. | V. | Rate per 100 kolls. | Amount. Rs. | A. | P. | Decrease. / Increase. |
| 748 | 1st | 56,107 | 9 | 3 | 75 | 42,080 | 8 | 7 | 311 | 1st | 22,301 | 9 | 6 | 100 | 22,301 | 12 | 6 | Rupees 31,979-5-11 |
| 446 | 2nd | 25,565 | 10 | 7 | 65 | 16,617 | 8 | 6 | 226 | 2nd | 13,069 | 8 | 6 | 90 | 11,762 | 11 | 7 | |
| 743 | 3rd | 33,164 | 8 | 10 | 55 | 18,240 | 6 | 4 | 305 | 3rd | 13,713 | 11 | 14 | 80 | 10,971 | 3 | 0 | |
| 229 | 4th | 9,345 | 7 | 14 | 45 | 4,205 | 6 | 4 | 81 | 4th | 3,115 | 1 | 1 | 75 | 2,336 | 5 | 0 | |
| 101 | 5th | 3,813 | 11 | 2 | 40 | 1,525 | 6 | 2 | 23 | 5th | 750 | 3 | 2 | 70 | 525 | 2 | 11 | |
| 157 | Inferior.. | 6,557 | 7 | 1 | 30 | 1,967 | 3 | 0 | 242 | Inferior.. | 11,899 | 8 | 6 | 40 | 4,759 | 14 | 0 | |
| 2424 | | 134,555 | 6 | 5 | | 84,636 | 6 | 11 | 1,188 | | 64,849 | 6 | 3 | | 52,657 | 1 | 0 | |

I have the honor to be,

Sir,

Your most obedient Servant,

(Signed) R. H. BEDDOME, Lieutenant,

COIMBATORE DISTRICT, 1*st May* 1860. *Asst. Conservator of Forests.*

*Note on Paragraph 5.*—It is worthy of remark that Teak planting seems now to be forced upon us, the demand is increasing, while the supply is diminishing, for instance, the Dutch Governor *Van Rheede* records of the "*Tectona grandis*" in the *Hortus Malabaricus*, 1690 "*Ingens arbor usque ad Calicolam.*" In the present day, nothing but scrubby stumpshoots are to be seen within three stages of Calicut, indeed, till we reach Mombat, and these are the re-production of a former growth, natural to the country, and which will with care again become of importance.—H. C.

# APPENDIX D.

## SIGÚR.

In May 1859, a sanction of Rupees 50 per month, was granted by Government for the conservation and working of Sigúr Forest. With this sum, amounting to Rupees 450 (in nine months) and the sale of Timber and Sandalwood, the following results have been obtained :— G. O. No. 668.

Rupees 1,000 have been remitted to the Accountant General, Rupees 100-10-11 is the balance of cash in hand, and the Timber on the ground may be valued at Rupees 4,000.

With so small a sum as Rupees 50 to commence with, it was some time before any wood could be collected, by an early sale of Sandalwood the means for working the Forest on a larger scale were obtained, and next year if wood be carted to Utakamund, I have no doubt but that a sale of some 10,000 Rupees worth might be effected.

*Carriage of Timber.*—At present the great drawback is the carriage of the timber, parties who may purchase timber from the depôt at Musnycoil, find themselves without the means of conveying it away.. Consequently the number of purchasers is very limited. The sales of Teak and Véngé for the last eight months, only realizing Rupees 157-1-6.

*Timber felling.*—The operations in the Forest have been chiefly confined to the felling of ripe Teak trees and Véngé. The trees are felled in November, December and January, when the tree is wintering; during the rising of the sap in March, April, May and June, the Curumbers are employed in squaring the felled trees. For the remaining five months, the men are employed in felling the trees after the full of the moon, when the sap descends, and for the remainder of the month when the sap is ascending, they are employed in squaring the felled logs. By this order

the timber seasons well and readily. There are but fifteen Curumbers and five pairs of buffaloes working in the Forest at present. Should the sale of the timber be increased, I propose to enlarge the establishment.

*Steam-saw-Mill.*—The works at Wellington Barracks being nearly finished, I would strongly recommend that the Steam-saw-Mill now working there, be removed* to Utakamund and made over to the Mudumallai and Sigúr Forests. The great drawback to the sale of timber in Utakamund, is the want of sawyers. Could we saw up our timber in Utakamund, the Public Works there, could be readily supplied, and the surplus sawn-timber disposed of by auction.

*Sandalwood.*—The Sandalwood cutting is proceeding regularly. A large number of the trees cut are quite decayed and fetch but little in the market; had these trees been cut in their prime, much loss would have been avoided. I propose a regular cutting of all trees which have made heart-wood and show signs of decay in their tops. The value of the Sandalwood is decreased some twenty or thirty per cent. by heart shake. The stealing of Sandal wood† by Moplahs, is now put a stop to. The vigilant measures pursued in Malabar and Mysore have contributed to this end.

(Signed) W. R. MORGAN, Captain,
*1st Asst. District Engineer,*
*in charge of Sigúr Forests.*

UTAKAMUND, *30th April* 1860.

---

# APPENDIX E.

## MUDUMALLAI.

*Supply of wood.*— During the past year, the supply of wood delivered at Wellington, has amounted to 41,079 cubic feet, this contrasts favorably with the former year when the supply was only 13,279 cubic feet, owing to my having been removed from the Forest and another Officer placed in charge. In addition to the above supply, 6,244¾ cubic feet of wrought timber from Gundelpett workshop, were also delivered at Wellington. Had this wrought timber not been required, the deliveries from the Forest would have amounted to nearly 60,000 cubic feet; the carriage from the Forest having been diverted to Gundelpett workshop.

*Roads.*—The Forest roads have been much improved from Tippúcadú to Carúr Hill, a road has been made 13 miles long with branch roads to Goganulla valley, Nardy and other parallel vallics, in all, some 21 miles in length. The road near the Karkhana, passes over the bund of a tank with two *calingulas* bridged, the formation of this tank has been of great benefit, securing a supply of good water in the hot weather to the people and cattle of the establishment. That bund makes a good road where formerly only an impassable swamp existed, and which swamp cut off all communication with the best parts of the Forest.

*Curumbers.*—The number of Curumbers has been increased. When I first commenced felling in the Forest I had eight, I have now 110 men steadily at work.

*Sawyers.*—Death and fever have terribly thinned the sawyers. I have now but five sets, where I should have at least ten. Consequently, I have a large amount of logs, which I cannot possibly move, until they are sawn.

*Elephants.*—The elephants now working in the Forest are five in number. We had six, but one died in August last, owing to the severity of the monsoon, and the others were so affected by the weather, that it became necessary to send them to Gundelpett for a time.

*Buffaloes.*—I have increased the number of buffaloes to 25 pairs, and by feeding them in the hot weather on grain, have been enabled to keep them in good condition. The buffaloes are only available for small logs, the sides of the Hills where the Teak is felled are very steep, and any log over 16 cubic feet, requires elephant power.

---

* The removal of the Steam-saw-Mill as suggested, may hereafter be advisable: but the services of an Engineer would be indispensible.—H. C.

† The suppression of the illicit trade in Sandalwood is highly satisfactory.—H. C.

*Timber Carts.*—I have now in the Forest, ten large carts capable of carrying beams of 30 cubic feet slung under the axle. The sling carts have been found very useful; in addition to these, are 24 small carts for working in the Forests with 20 pairs of bullocks and 20 drivers. Our carts are employed in bringing beams from the out-stations to the Karkhana, and to the main road near Tippácadá where depôts are formed. In the monsoon weather, when the Forest roads are impassable, Contractors' carts carry the timber from the depôt at Tippácadá to Utakamund. I have found it very advantageous to employ the Forest bullocks; these people being apt to overlook the important matter of feeding cattle entrusted to their care.

*Coolies.*—The rise in wages, increase of cultivation in Mysore, owing to good monsoons, and the great demand for labor on these Hills has rendered the procuring of labor for the Forest very difficult; however, owing to the main roads having been finished and little labor being required to keep them in order, this disadvantage has not been much felt.

*Mode of felling the Trees.*—During the past year a large amount of timber has been felled, attention being paid to the seasons. In December, January and February, the Curumbers are simply employed in felling—the tree wintering for those three months. In March, April, May and June, when the sap is rising, the Curumbers square the felled trees, and for the remaining five months they fell and square, felling after the full of the moon when the sap is descending, and squaring the other half of the month when the sap is ascending. By preserving the above order, the timber seasons more readily and better.

*Provision Store.*—The former Provision Store being thatched, was dangerous; moreover, in the monsoon season, grain was apt to get damaged. I have therefore built a new Store-house with a ventilated flat roof, this will secure us from all danger of fire and loss by damage of grain.

In conclusion, I have the honor to remark that the Forest lease has still three years to run, that to get the utmost we can out of the Forests in that period, is the most profitable course* to pursue; that if a large depôt be formed at Musnycoil and only small quantities of timber are carted up to Utakamund, much of the carriage now employed in carting to Uty might be employed in carting to Musnycoil, and in three years' time a supply for Public buildings for some years to come might then be obtained,—a supply which might fairly be estimated at 200,000 cubic feet of seasoned timber.

(Signed) W. R. MORGAN,
*1st Asst. District Engineer,*
*in charge of Mudumallai Forests.*

UTAKAMUND, *30th April* 1860.

---

# APPENDIX F.

## SALEM.

I have the honor to submit for the information of Government, the following brief Report of my operations in the Forests of Salem, for the year 1859-60.

2. On several occasions I visited the Cottaputty jungles with the Officers of the Railway Company, for the purpose of supplying sleepers to the Madras line, from Tripatore to Salem.

3. I believe there are very few Contractors under engagement to the Railway Company, and as these men were not cutting quick enough to meet the immense demand, the Company was at last obliged to purchase sleepers from persons who would supply them even with four or five at a time; and the consequence was, that I was overwhelmed with applications from petty Contractors, so that my peons were not able to mark trees for them with sufficient rapidity, and I had no alternative but to allow these men to cut in the jungles with little control† over them.

* The energetic working of this Forest is clearly advisable and has been ordered in G O., 16th July 1860, No. 1,521, paragraph 4; as the Barrack Funds are exhausted, I propose in a separate letter that it should be worked on behalf of Government upon the same system as the North Canara and Anamallai Forests.—H. C.

† *i. e.* comparatively.—H. C.

4. At first (1858), the amount of rejected sleepers was about 15 per cent., but latterly the woodcutters got into the way of cutting only those trees that are fit for sleepers. On looking over the statements of rejected sleepers, I find the average rate now is five per cent.*

5. The trees marked by the Forest peons were all approved of by the Officers of the Railway Company; and these were mostly Véngé, Acha, Kalli, Cadukai, Carru-véngé, Carrúngalli, and Vel-véngé.

6. The manner of cutting is still without judgment, and great waste of timber is the consequence. A tree is marked by a Forest peon, and registered as containing four sleepers, and given over to the woodcutter he cuts the tree down, and may perhaps adze it into one sleeper. As the woodcutter pays nothing to Government for the timber, he cares little whether the tree will cut up into four or one sleeper, and has not the requisite skill to quarter the log. The only method I can see of preventing this wastage of timber is, that Government should gradually take the whole control of working the Forests under the *Amani* system.

7. Besides the supply of sleepers, there is a considerable amount of timber cut for building purposes, and I may say an increasing demand for export. I have granted 300 licenses for permission to cut 6,470 bandy loads of timber in the Forests of Salem, for the year 1859-60. A seignorage fee of one Rupee is paid for each bandy load of wood: this amount is collected at the different Tannah stations under the management of the Collector, and has unfortunately been entered in the books as land revenue, without a separate column. I have no hesitation in saying that a much larger amount might be realized, if the owners of the licenses were made to abide by the terms laid down in the license.

8. I would recommend a strict limitation of the practice of *Púnakad*† cultivation by Malliallis in these jungles, and an entire prohibition in the virgin Forests which remain. This rude system has increased of late years to such an extent on the Shervaroy Hills that the tops are quite denuded of timber. I also remarked the same destruction going on, in the Javadi Hills, and have addressed the Collector on the subject. Mr. Fane, when Acting Collector, issued a proclamation on the subject; and it is very desirable that leave should in every case be obtained from the Revenue authorities, as in Canara.

9. Mr. Yarde, the Overseer, reports having marked 2,803 Sandalwood‡ trees on the Javadi Hills, varying from 3 to 14 feet in length and 10 to 30 inches in girth. About 15,000 young plants have been counted and registered. I am now proceeding to these Hills for the purpose of ascertaining whether any of these Sandal trees are full grown and fit to be cut into billets.

I have the honor to be,
Sir,
Your most obedient Servant,
L. BLENKINSOP,
*Asst. Conservator of Forests.*

---

# APPENDIX G.

## NORTHERN CIRCARS.

*Extract from Diary.*

*Eskapilly.*—On 31st January 1859, I took advantage of the departure of Her Majesty's steamer *Dalhousie*, to visit the Northern Circars. On the following day, the vessel touched at Eskapilly in Nellore, to take in Treasure. The shore is barren of wood, palmirahs are seen among the sand hills, but except the extensive salt-pans, there is nothing of any interest.

On the 2nd February, I landed at Masulipatam, which used to be considered a bleak station, but it has been much improved since the year 1838. There are now avenues of

| | |
|---|---|
| Casuarina muricata. | Inga dulcis. |
| Pongamia glabra. | Dalbergia Sissoo. |

The trees have not yet grown large, but they afford shade and shelter, and relieve the former

* The diminished ratio of rejected sleepers from 20 per cent., to 5 per cent., is satisfactory.—H. C

† The restraining of *Púnakad* (i. e. *Kumari*) is important, it should be under the same restrictions as in Canara. Orders to this effect have appeared in the Salem Gazette.

‡ The discovery of so many Sandalwood trees in a new locality is interesting, and may be a source of revenue hereafter: the quality of the wood has yet to be ascertained.—H. C.

dreary aspect of the station; the best of the Sissoos have a bole of 15 or 20 feet high, with one foot diameter.

My attention was directed to a Mangrove* belt lying on the edge of the backwater, which was formerly barren waste. In the year 1839, two canoe loads of seeds of species of *Rhizophora* (Uppu ponna) *Avicennia tomentosa* (Mada chettú) and *Sonneratia*, had been procured by Mr. Rohde (at that time Assistant Judge), at a cost of 25 Rupees; the seeds were dropped into the mud of the estuary by convicts. The belt sprung up quickly, and has been annually cut, yielding a trivial revenue both for firewood and feeding cattle. It is also useful in preventing the channel from being clogged with drift sand. In the Canal basin, I saw about a dozen firewood boats which had come in during the night from the Godavori, and concealed below the heaped up billets, I recognised house beams of Yépi (*Hardwickia binata*), and Siriman (*Conocarpus latifolius.*)

*Vizagapatam, 6th.*—This is a picturesque station, but the red soil does not seem suited for tree culture, and the only place where I found fine trees were in the gardens of Goda Surya Pracasa Row and Narrain Row; there were Mangoes, Sapodillas, Oranges, and *Lagerstræmia Reginæ*. The Cashew-nut thrives well at Waltair. On my return, a few weeks later, I inspected, at the suggestion of Mr. T. Knox, Principal Assistant to the Government Agent, an exceedingly interesting private garden, formed at Ankapilly, by the late Goda Surya Pracasa Row. This interested me exceedingly, and I addressed the Agri-Horticultural Society on the subject, thinking the matter deserving of their notice. A silver medal and certificate were awarded as heirlooms to the family. The size of a few exotic trees as Mahogany, Cayaputi, and other MYRTACEÆ, particularly attracted notice, showing the richness of the soil and the comparative humidity of the climate under the shelter of the Vindyan† Hills. The greater part of this Collectorate is Zemindari. I have nothing to remark save that I hope enlightened proprietors will take up the subject of planting on river banks as a speculation, which will probably prove profitable as the present demand for timber is sure to continue.

*Bimlipatam.*—In proceeding along the beach, I found the sand binders *Spinifex squarrosus* and *Ipomea pes Caprœ* (goats-foot creeper,) with the addition of *Phœnix acaulis* (the stemless date,) not found further south. The large Sugar factory at Chettavulsah receives its supply of firewood from a great distance, and experiences considerable difficulty in obtaining sufficient quantity.

*Chicacole.*—The Belgaum walnut, *(Aleurites triloba,)* thrives well, several hundred trees have been planted along the road by the District Engineer. The Dividivi, *(Cæsalpinia coriaria)* is in great use among the Chucklers, and fruits freely.

My attention was directed to a wood called "*Damonu*" or "*Karkana*," light and elastic, this comes nearer than any other indigenous wood, I have seen to Lancewood or Hickory. It is said to be *Grewia tiliæfolia* or *G. elastica*. It is procurable in the bazaars (8 inches broad), and is used for houseposts, gig shafts, dooly poles, spear handles and fishing rods. Many hundred poles could be obtained from the Parla Kimedy jungles. It seems eminently suited for purposes where strength, lightness, and elasticity are required. The bark should be allowed to remain, the poles should be steeped in water and then rubbed with oil.

Topes of mango and tamarind are to be seen at Chicacole, Masulipatam, Berhampore and Russelcondah; they would be of great use to the travellers along the northern road about Hurripur, and in the neighbourhood of Teckelly.

The scrubby jungle begins at Cassibuga and extends beyond Itchapore, but it is evident that the sea-face of the mountains in this district, does not contain any tree vegetation which can be denominated Timber. I met in a Dâk bungalow, Mr. Clarkson, an intelligent officer of the Trigonometrical Survey, who corroborated this statement and pointed out on the map the positions of the Forest wood tracts, and I found his information very correct.

*Berhampore.*—On the 12th February, I reached Berhampore, and had a conference with the Collector Mr. G. S. Forbes, as to the Sál Forests of Gumsúr, it will be remembered that his predecessor, Mr. W. Knox,† "urged the propriety of some measure being adopted for the due economy and preservation of the Forest timber of this district."

† E. M. C., 27th March 1858, para. 4, R. D

* This affords a main supply of fuel to the station, and is conserved under the orders of the Collector.

† Under G. O., 73, 10th January 1860, two Wardian cases containing Coffee plants were forwarded from the Bangalore Garden to the new sanatarium on the Galiparvatum behind Vizagapatam.

It may be well here to mention the attempts hitherto made to turn these Forests to account. In 1851, Mr. G. Williams entered upon a contract to supply Railway sleepers: this was the first effort made to work the Sál Forests of the North Circars. The wood was found to be superior; but the contract failed. I need not enter into particulars, as the correspondence was published in the Railway Records for 1852.

The late Mr. Overseer Harton, also felled and despatched Sálwood from Cuttack to Madras, on account of the Gun Carriage Factory, and a Commissariat Overseer (Mr. Weldon)* is now employed upon this duty in the Sumbulpúr mahals. With these two exceptions, I believe that no systematic operations have hitherto been attempted. The following Extract from a Minute of the late Commissioner of Cuttack will explain one source of failure.

" There is much difficulty in getting timber of the dimensions required by the Gun Carriage Factory. The largest trees near to the river have been removed, and the Rajahs do not evince a willingness to cut those in the more distant Forests, and require much persuasion to induce them to afford the requisite aid; without which, no timbers of the desired dimensions can be procured. Again, the labor of the coolies employed by the Rajahs to remove the timber, is compulsory and unremunerated. On the other hand, if they be employed by the Agent, the Rajah or his servant exacts a portion of their hire. They are, therefore, not over-willing to lend a helping hand."

Records of Bengal Government No. iii of 1851. Settlement of Cuttack, para. 70, Minute by A. I. M. Mills, Commissioner.

The only printed record of the Gumsúr Forests, is a list of the trees with remarks on their uses, (published in Balfour's *Cyclopœdia of India*, page 1910,) carefully compiled by Lieutenant Macdonald, giving much useful information; the Botanical names chiefly extracted from Sutton's Ooriah Dictionary, are somewhat antiquated, and occasionally erroneous. I took this list with me, and have corrected the names of such trees as were observed in my short excursion.

The Sál tree of Hindostan extends in a nearly unbroken belt of forest along the Terai, from the Ganges at Hurdwar to the Barrampúter, *(Falconer)*. It is abundant also on the banks of the Indrawatti *(Beddome)*.

It belongs to the genus SHOREA, and is indigenous to the mountainous parts of the Vizagapatam and Ganjam Collectorates. It is a smaller tree in Golcondah and Kimedi than in Gumsúr, and I have not seen any specimens south of the Godaveri.

Sala, *Sans* Soringhi, *Or.* Gugillam, *Tel.*

There was some doubt as to the Botanical identity of the Gumsúr tree, but I was fortunately able to determine this point when in Calcutta three years ago, by comparing specimens received from the Honorable Walter Elliot, then Commissioner of the Northern Circars, (who first drew my attention to the subject) with the sub-Himalayan specimens at the Botanical Garden, Calcutta; and again by bringing down twigs this year, I find them accord precisely with Roxburgh's plant.

It may be well to notice the singular aptitude of the seed of this tree for speedy germination, in connection with prospective measures of conservancy.

" The seed has the utmost susceptibility of germination, with a vitality so limited in duration that it will not survive many days unplanted. The Sál seed ripens at the commencement of the rains and after the first shower, falls *actually sprouting* from the tree. I have frequently seen in the forests near Kurdwar, the radicle of the germ protruded (that is growing), while the fruit was still attached to the parent tree. In consequence, young plants come up in the utmost profusion, and very often so thick as to choke each other: they form patches of forest, which are literally impenetrable, till the woodsman removes them as *Bullees* or *Kurrees* In this manner the forests are maintained wherever a tree remains standing to perpetuate the stock." (*Falconer's Report*, page 30).

The most important and accessible of the Sal Forests are in the *Taluq* of Gumsúr and in the Zemindary of Bodogoda, both of which are traversed by rivers which admit of rafting the timber to the coast during the freshes which, however, are of short duration. The names of the principal jungles in Gumsúr are Kukuluba, Gulleri, Juggernatprasad, &c. It would probably not be of much use to particularise all the Mootahs or Estates. The accompanying sketch map prepared by Captain Phillips, 5th N. I., indicates the route I followed, the area occupied by

* Subsequently to my visit, Mr Weldon was recalled, on account of various difficulties he met with, in fulfilling the duties entrusted to him.

Sál Forests, with the roads and water communication between the forests and the coast. The Sál is the most useful as well as the most abundant tree in these Forests, which are therefore distinctively called Sál forests. It was coming into foliage at the time of my visit, and I had opportunities which never occurred to me before of observing its mode of growth.

The tree grows remarkably tall and straight in the forests. In open places, it yields a thick trunk, throws out branches and becomes umbrageous: young and old are cut down without distinction from the five years old sapling to the full grown tree, and this has been proceeding for a lengthened period without any conservancy rules; thousands of young trees are removed to form posts for native houses, and telegraph poles; others of a larger size, might be useful for public works and officers' houses; and if sâwn longitudinally they would give excellent half round sleepers. With this heavy drain upon the Forests, young plants spring up in the greatest profusion, and often so thick as to choke each other. The woodsmen remove the promising poles, and provided that a few trees remain as standards per acre, to perpetuate the stock, so remarkable is the germinating power of the seed that, there is no fear of exterminating the forest. I measured the straight stump shoots of two year's growth, and found them 12 feet high and 3 inches in diameter at the base. Large patches of Sál forest are cleared annually for the purpose of cultivation, and this is usually effected by fire. I came upon several places where some hundreds of fine straight charred poles were standing.

The Khánds do not, however, destroy fruit trees indiscriminately. They are careful to preserve the mango and the date, the wood-apple and the *Rottleria tinctoria*, the bastard sago and the elupi; the two last as already stated, yield intoxicating liquors.

In Gumsúr and the other Government tracts of Forests no taxes are levied as by the adjoining Zemindars* and no revenue whatever is derived from them.

Throughout the inland part of Gumsúr, there is far more timber than is required for local consumption, but there is no doubt that with the exception of the Hill tracts, the jungles are rapidly diminishing from Government lands, on the level country and up to the foot of the Ghâts, partly owing to the increase of cultivation and partly to meet the demand for timber at Aska, Berhampore, Russelcondah, &c.

In the days of the Rajahs, the felling of timber was systematically discouraged, so as to render the country less accessible to a military force.

At present there is no system of Forest conservancy, but orders have been issued by the Collector, forbidding the indiscriminate destruction of trees. I may also state that I explained fully and particularly to the principal wood merchants and to the Aska firewood contractors, that low cutting of trees and reservation of the finer kinds was of the utmost importance to the Government and to the people themselves. They promised to follow my instructions. The probability of the appointment of a Government Overseer was intimated to them, and that his salary would be met by a small tax.

Certain trees are always carefully preserved, they are chiefly,

1. Mango.
2. Date.
3. Wood-apple, *Koeto*.
4. Bauhinia, *Bovada*.
5. Rottleria tinctoria, *Sùndosagúnda*.
6. Caryota urens, Solopo.
7. Bassia latifolia, Mohollo.

The two last are reserved on account of the intoxicating liquors which they yield, and which are in great request. From what I witnessed, it is to be feared the Khunds are becoming a dissipated people.

*Ganjam.*—There is an abundant supply of wood for burning in this district. In some parts it has been much reduced as in the Beredy Zemindari, where all the large trees have been consumed in boiling salt, the usual mode of manufacture by solar evaporation not being practised there. Again in the Gumsúr *taluq* on the banks of both rivers leading to Aska, great clearances have been made, often preceding cultivation, but sometimes occasioning the destruction of fine Sál timber.

* Such as 2 Annas on a new Bandy, 1 Rupee on a new Boat; 1 Rupee 8 Annas on a Mast; ½ Anna on a bandy firewood; 2 Annas on a bandy of Bamboos; 2½ on a bandy load of Planks; and other small sums on Wood taken for Ploughshares, Sugar Mills, Oil Presses, &c. The Zemindars also collect money on honey, dammer, [arrow-root, and other jungle products, which are sold separately or collectively to a Jungle renter.

As this district requires opening up, and there is a great abundance of wood, all that seems necessary is to reserve the Sál and a few other superior woods, confining the firewood cutting to the woods of less value. Instructions to this effect were fully given in my presence to the Contractors, who tender for the supply of the Aska Factory.

The road from Russelcondah has been cleared up to Durgaparsad, near the foot of the Kalingia ghaut. The Khúnds come down once a week to the market at Belligunza, bringing oil seed, wheat, turmeric, and a little cotton, they return the following day. Captain Harrington is building a large Choultry as a rest-house for them. It is intended to continue this road to Sumbulpore, where it joins the high road to Nagpore. It opens up much of the Sál forest although it avoids the river and keeps to the high ground, where the trees are not so well grown. Side tracks would be required in various directions, but these would be easily made. It may be well to mention that there is a made-road from Ganjam to Russelcondah (viâ Berhampore), in which the streams are all bridged, and further that bandies have recourse to the forest from Russelcondah and even Itchapore, a distance of 76 miles.

It was a most interesting sight to see 80 children of the State *(Sirkar ki Buchay)*, as they call themselves,—rescued Meriahs, engaged in making a road, which is calculated to open up the resources of the country and to civilise the Khúnds. The wages of these Meriahs was 4 Rupees *per mensem;* boys 3 Rupees *per mensem.*

I put the following questions to the headman of a Meriah village, and who, I believe, was the first man rescued from death.

1*st Question.*—Are there any persons who would prepare rafts and float to Ganjam; constant employment would probably be given.

*Answer.*—Yes, my people would readily prepare rafts of Sál on the river-bank, but we do not wish to leave our fields. (*i.e.* floaters must be engaged).

2*nd Question.*—What would be the cost of cutting a log 5 feet in circumference and 15 feet long.

*Answer.*—Such a log would be cut and squared for 4 Annas, and dragged to the river for 2 Annas more.

The general result of my tour of inspection may be summed up thus:—

The Sál forests of Gumsúr are the most valuable tract of wood on the Eastern Coast, and the only one I have seen which would repay European superintendence. Still it could scarcely rank in value with a second class Forest of the Western Coast.

Perhaps there are parts of Rajahmandri and Masulipatam, which may hereafter be found to contain teak of more value than the Sál of Kimedi and Gumsúr, but at present there is nothing left on Government land, save seedlings of comparatively small girth, the Godaveri river banks having been cleared, and the best wood entirely exhausted.

In consequence of the unhealthy climate of Gumsúr, and the difficulties which would be experienced by European or Eurasian Overseers, I think the work of felling and preparing rafts should be organized at Ganjam.

The working operations of the Sál forests in Gumsúr talúq, would be divisible into three distinct stages.

I.—Felling and transport to river bank.
II.—Floating the rafts to Depôt (Ganjam,)
III.—Shipping to Madras.

In addition to those operations, the Forest Assistant or Overseer should be charged with the necessary measures for conserving the young trees.

The first should be carried out by Natives—Khúnds, Meriahs, or Ooriahs, with a Conicopoly and perhaps a *Gomastah*, the latter might probably be secured at the rate of 12 or 15 Rupees per mensem. The second would be arranged by floaters, procurable in the towns of Russelcondah and Suradah, or at least in Ganjam. The third operation must be left to coast traders, such as Messrs. Valleix and Linares of Gopalpore, or Hoffland of Vizagapatam. The depôt should be at Ganjam, where there is generally a Salt Agent and subordinate of the Department Public Works.

The rafts would come down early in the monsoon (July or August), and the timber remain

in store till the close of the rains, when ships arrive. A sufficient quantity to meet the demand of the season should be sent by the first freshes, as cartage is very expensive. The timber should be put under cover, as Sál suffers much injury from exposure, splitting, and warping. When there is a sufficiency of timber, an advertisement might be inserted in the *Fort Saint George Gazette*, intimating that a ship might obtain freight.

Concluding Note.—The sanctioned amount allowed for the fixed establishment of the Forest Department being all but expended, I am unable to propose any definite arrangement at present. I feel certain that it would pay well to have Overseers for Gúmsúr, Kúrnúl, Kótagiri and Southern Salem.

---

# APPENDIX H.

## RULES FOR THE PRESERVATION OF JUNGLES IN THE DISTRICT OF COIMBATORE.

1. No Timber exceeding 12 inches in diameter, nor any of the Trees specified in paragraph 8, are henceforth to be felled in any of the jungles, the property of Government.

2. The villagers may cut fuel and firewood for domestic purposes in low jungles and brushwood, without taxation, as they have hitherto, but *not for sale*.

3. Charcoal burners may only cut in such places as may be assigned to them and are *not* to cut the trees noted in paragraph 8, whether in those places or elsewhere.

4. The land to be assigned for cutting fuel, &c., shall in all practicable cases, be selected near the inhabited villages, so that the clearings may prove an advantage to the residents.

5. The people may likewise cut wood required for the erection of their dwelling houses, but this privilege will be restricted to *bonâ fide* Ryots, the wood to be so felled must not be more than 3 feet in circumference at 2 feet from the ground, nor be one of the kinds noted in paragraph 8, in all cases 30 standard trees must be left on every acre of ground.

6. Wood required for agricultural implements will be allowed to be taken untaxed by all Ryots, and in the same manner bamboos also may be cut for the actual and *bonâ fide* erection of their houses, *not for sale*.

7. No fruit tree shall be cut down or injured; in like manner all trees likely to become timber, as well as saplings of every kind should be preserved.

8. The names of the trees and shrubs, to be always reserved for the value of the wood or of their products, are mentioned below:—

I.—Trees to be reserved for the value of their timber.

| | | |
|---|---|---|
| 1. Sandal. | 7. Palmirah. | 13. Cuddum tree.† |
| 2. Red Saunders. | 8. Jack tree. | 14. Babul tree. |
| 3. Ebony. | 9. Acha marum. | 15. Siriss.‡ |
| 4. Satinwood. | 10. Maruda tree. | 16. Catechu. |
| 5. Teak. | 11. Common Terminalia. | |
| 6. Blackwood. | 12. Glabrous Terminalia. | |

II.—Trees or shrubs to be reserved for the value of their products.

| | | |
|---|---|---|
| 1. Custard apple. | 5. Elupé. | 9. Secoymarum.§ |
| 2. Guava. | 6. Cashewnut. | 10. Pinnay tree.¶ |
| 3. Soapnut. | 7. Tatancottay. | 11. Tamarind tree. |
| 4. Capila-rung.‖ | 8. Surul Chukkay.* | |

9. On fuel firewood and bamboos cut for sale, a fee of 5 Annas for every cart load, one Anna for every bullock load, and 3 Pice per man's load will be levied, and the amount so collected will form a fund to be laid out in new plantations or in the preservation and improvement of the existing ones.

| | | | |
|---|---|---|---|
| 1 Man | 2 maunds | 3 Pice. |
| 1 Bullock | 8 „ | 1 Anna. |
| 1 Cart | 40 „ | 5 „ |

‖ Rottleria tinctoria.

* Ventilago Maderaspatana.

† Nauclea cadamba.

‡ Acacia speciosa.

§ Acacia concinna.

¶ Calophyllum inophyllum.

10. A fee of *one anna* will be levied on every basket of charcoal made in Government woods

11. The village officers are authorised to collect the fees at the rates above set forth, and remit the same to the Talúq Treasury like other collections of revenue: any extra collection, misappropriation of the funds, &c, will render them liable to the penalties provided for in Regulation IX of 1822.

12. Every case of evasion of the payment of fee on the part of the people, and of the unauthorised cutting of wood will be considered as a fraud, and dealt with accordingly.

13. The preservation of the Government jungles, topes, and fruit and timber trees from destruction, devolve upon the Village officers, who will be held responsible for any breach of these rules: where the Forests are extensive, and cannot be conveniently and efficiently overlooked by them, they will be aided by the Talúq Establishment.

14 These rules are applicable to all the Talúqs, exclusive of the Nilgiri Hills.

# CIRCULAR NO. 10.

## TO MAKE CHARCOAL.

The best sized wood for this purpose is what is, generally understood as Billets. An ordinary sized kiln requires about 25,000 billets cut as nearly as possible of the same length. Procure a pole about 25 feet long and 6 to 8 inches thick, straight and of uniform thickness. Provide yourself with four forked sticks of the shape of *fig.* 1. Erect the pole perpendicularly on the spot where the kiln is to be made and place the four forked sticks round it, arranging pieces of wood from fork to fork and across, to make a hollow space in the centre of the kiln for containing combustible matter, this forming a space of about 18 square inches as *(fig.* 2*)*. Provide the person stacking the billets with a yard measure, and let him proceed to place the end of the measure against the pole, sitting at the other end of the measure, the billets are then to be placed in an almost perpendicular position against the cross pieces, and as close together as possible, each cooly stacking right and left to join his neighbour's work on either side. Thus he goes on stacking until he has come to the end of his measure; all having done the same, a perfect circle will be the result. After having filled up all interstices that may have occurred from crooked or large billets, each cooly pulls out his measure to another yard in length and proceeds as he did before. Having done this the third time, the kiln will measure 18 feet in diameter, which ought to take 25,000 billets. The coolies then mount the first layer of billets and commence stacking from the pole, until they come to the end of the first layer, and so on a third and fourth layer, until the kiln is completed, (as shown in *fig.* 3). Cover in the whole kiln with turf, turning the grass side

FIG. 1.

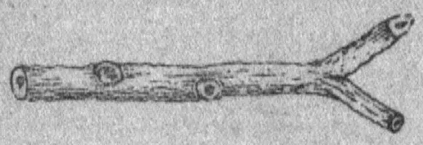


FIG. 2.

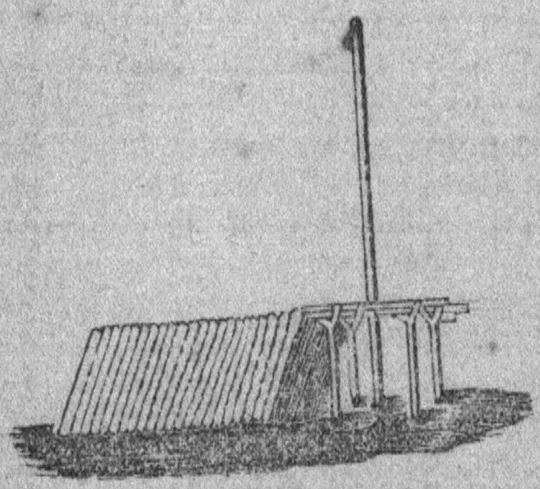
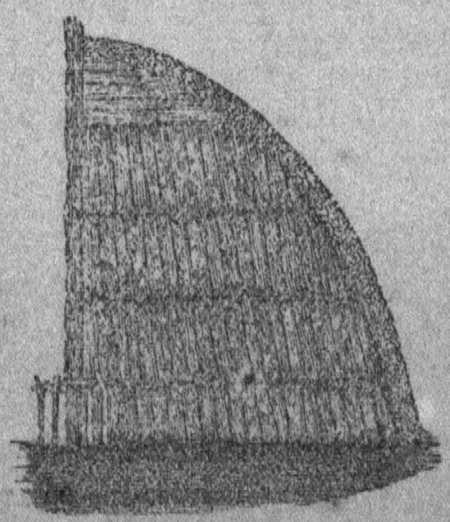


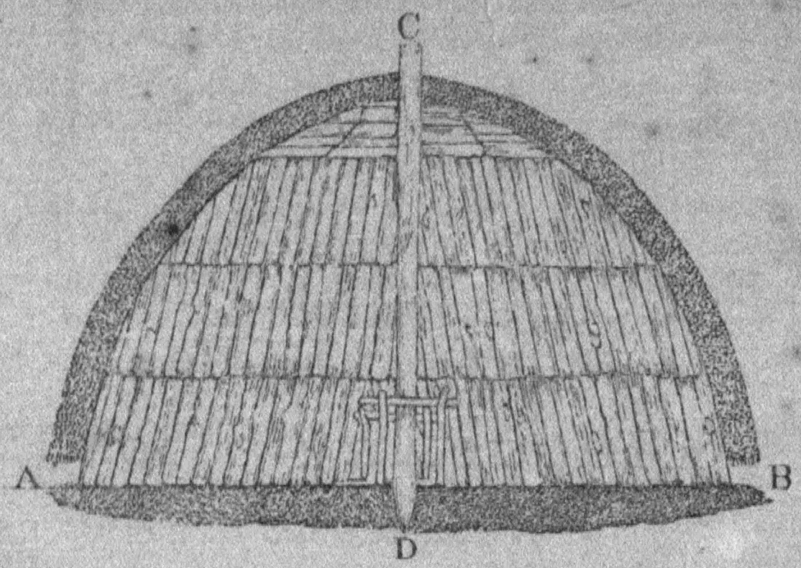
FIG. 3.



*Section of one-half of the Kiln.*

inwards, commencing from the bottom; after which throw a small quantity of loose earth over the turf, beating it down with the back of a spade.

Fig. 4.




*Section of an entire Kiln.*

After the whole kiln has been covered in, let one or two men ascend the kiln and pull out the pole, leaving an empty space from top to bottom of kiln. From the top, drop in a ladle full of ignited charcoal, and immediately this is done, open out one turf at the bottom of the kiln, say at A. This will cause a draft of air in the direction of A D C, and in a few minutes, flames will be seen ascending at C. Let this continue for 5 or 10 minutes; till you have satisfied yourself the billets in the centre of the kiln are on fire, when one man must be sent up with a large turf to close the opening at C over which he should sprinkle earth to keep in all flame. *From this moment no flame must be allowed to escape from any part of the kiln.* When the opening at C has been closed, one at B should be made. The billets in the direction of D A and D B will then ignite faster than any other, and when smoke is seen escaping between every turf in the direction of A C. and B C. the openings at A and B must be closed and fresh ones made, say at E and F; these will be closed in their turn and others made at G H and I and J. Shortly after this is done, it will be perceived that smoke is proceeding uniformly from every crevice, when all air holes at the bottom must be closed. The whole kiln will then fall in and assume something* of the following shape at the end of 36 hours.

Fig. 5.

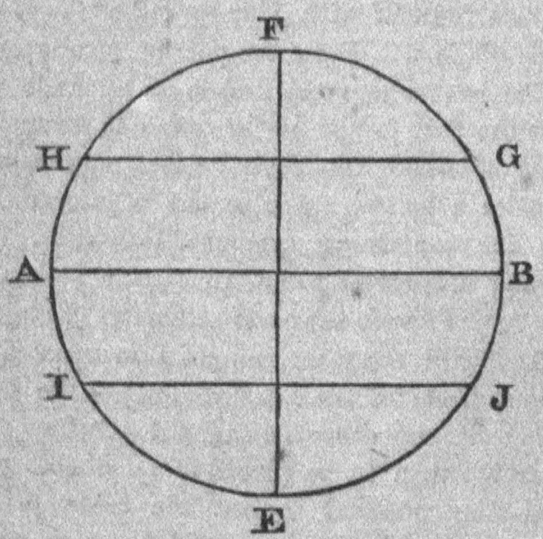
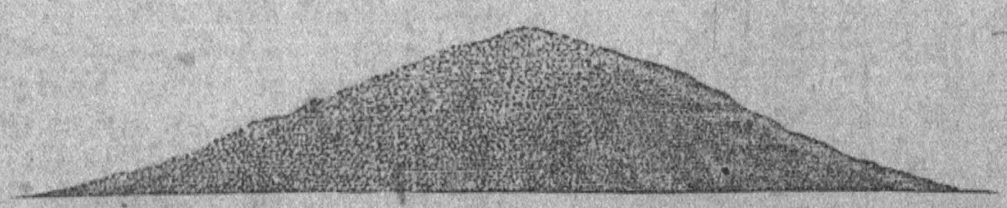



Fig. 6.



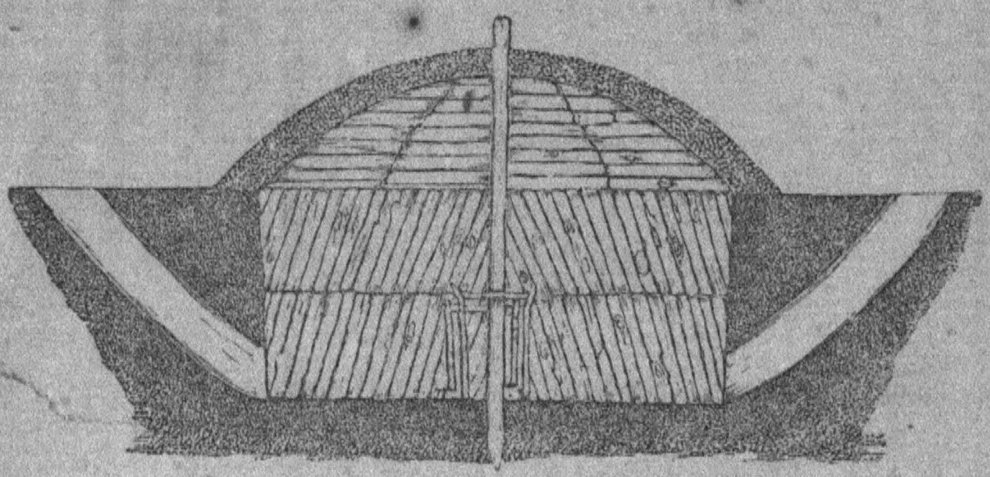
Earth enough must then be thrown on with shovels to *extinguish all smoke.* At the end of 36 hours more, the charcoal may be raked out. A few buckets of water should be in readiness, if required to put out the sparks of fire which may remain.

* The bulk remaining should not be so much reduced.

Great care must be taken to stop every fissure in the casing, and if from bad management the heap settles, and the casing falls in at any part, the cavity must be filled up with green wood kept ready for the purpose, and sods thrown on and covered with earth. As soon as the dense smoke ceases, and the wood burns with a light transparent smoke, the whole is closed in and watched, least any fissures should open.

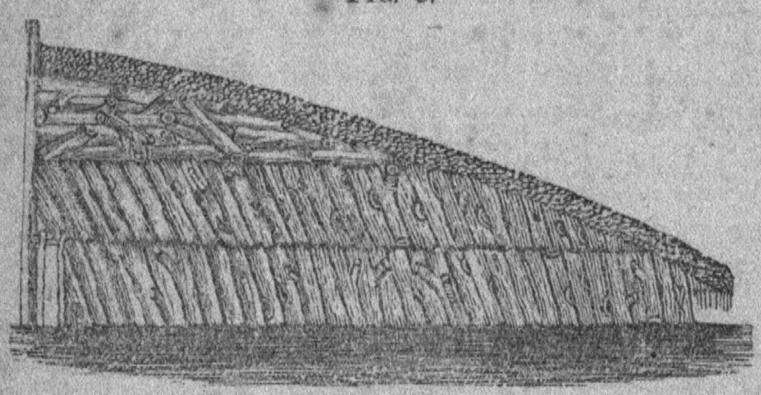
In burning in pits, the system is the same, but vent-holes are formed in the sides, and the covering of sods &c., being more accessible, is more easily formed and kept.

FIG. 7.



In pits, the wood is more conveniently packed, as shown above *(fig. 7)* and the logs in the middle of the lower course should be dry and have a few chips and refuse charcoal from former kilns among them; in other respects the practice is the same as with the piled kiln.

FIG. 8.



In some places, it may be convenient to form a kiln by digging out the side of a hill, as *(fig. 8)*, but in all cases the system is the same. If the process is properly conducted, the bulk is but little reduced.

In this tropical climate, where vegetation is so rapid, it is not necessary to cut down trees for charcoal, but merely to lop off lower branches. On dry forest land, a crop of wood can be obtained every fifth or sixth year, and on marshy land, every third year.

H. CLEGHORN,

*Conservator of Forests.*

MADRAS, *6th September* 1860.

---

N. B.—Much of the material embodied in this Circular was obtained from a European engaged in the manufacture of Charcoal, and from Mr. Rohde, C. S.

H. CLEGHORN.